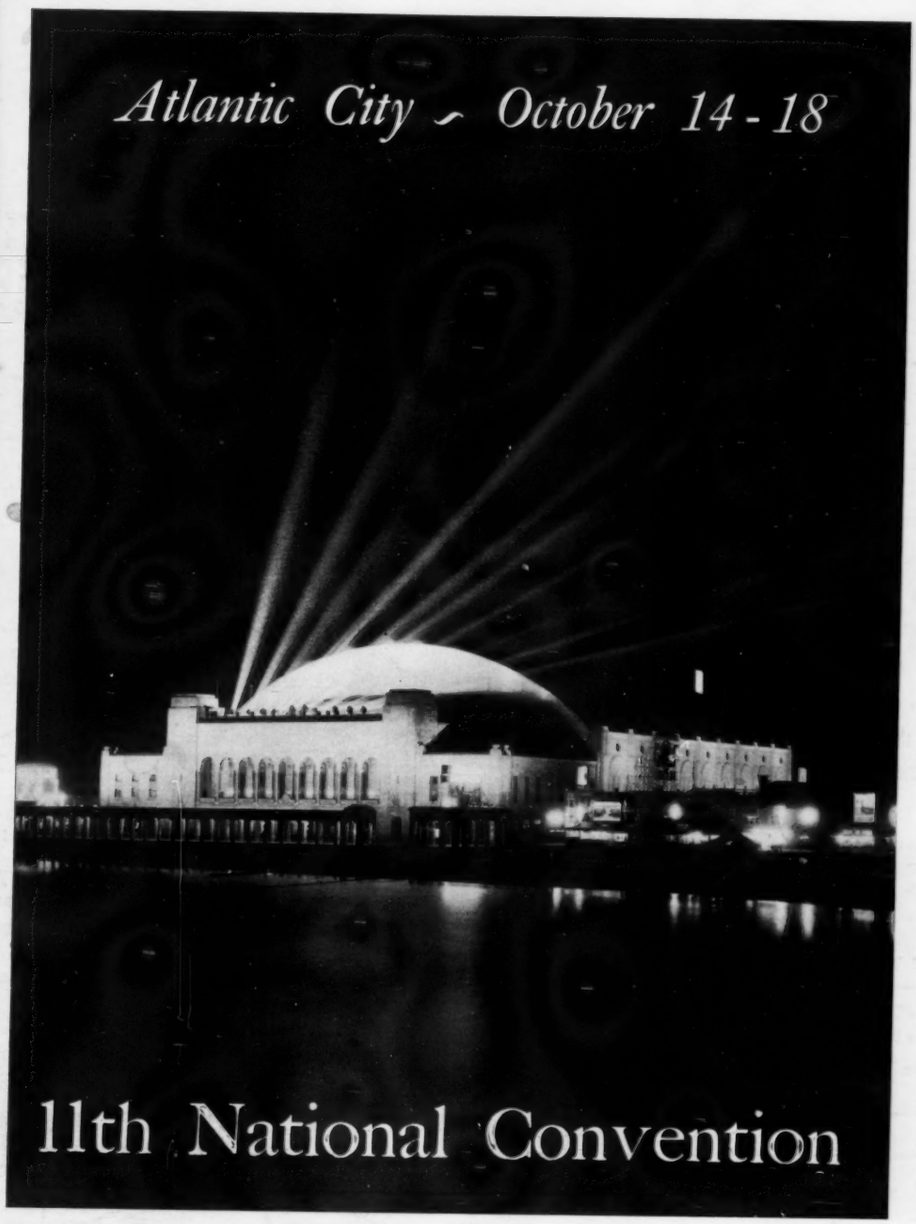
WESTERN GAS

October
1929

20 Cents
the Copy



11th National Convention

The new Municipal Auditorium at Atlantic City, in which A. G. A. sessions will be held.

A MONTHLY JOURNAL DEVOTED TO THE
WESTERN GAS & APPLIANCE INDUSTRIES

$500
FOR A SLOGAN
(19 Cash Prizes)

Write a Slogan about Nordstrom Valves

The manufacturers of Nordstrom Valves seek a new slogan pertaining to these valves...a slogan that will suggest the service or function, features or advantages.. or some easily remembered phrase that will identify the excellence of Nordstrom Valve service ¶ The slogan..."**Won't leak...Won't Stick**"...is now used, but there are so many outstanding features of Nordstrom Valves with which you are familiar that surely you can think of several good slogans Your plant engineer may have some suggestions to offer too! ¶ If desired we will send a catalogue describing the various features of Nordstrom Valves which may give you a clue to a master slogan. ¶ You have 19 good chances to win a cash prize. "Think up" a slogan now. Send it in. Send us more slogans as they occur to you. But start now!

CASH AWARDS	
First Prize . .	$250.00
Second Prize . .	100.00
Third Prize . .	50.00
4 Prizes, each . .	10.00
12 Prizes, each . .	5.00
TOTAL 19 CASH PRIZES	$500.00

RULES
of Slogan Contest

...Anyone is eligible except employees of Merco Nordstrom Valve Co. or affiliated companies.

Slogan must not exceed 10 words Any number of slogans may be submitted by same person. Use coupon below or separate sheet of paper Contest closes December 31, 1929

JUDGES

The judges will consist of one official of the Merco Nordstrom Valve Company, one representative of a well known trade publication organization and one advertising counsellor.

FILL IN THIS ENTRY BLANK AND MAIL

MERCO NORDSTROM VALVE CO.,
343 Sansome St., San Francisco, Calif.

I submit the following slogan(s) pertaining to Nordstrom Valves:

_____

_____

_____

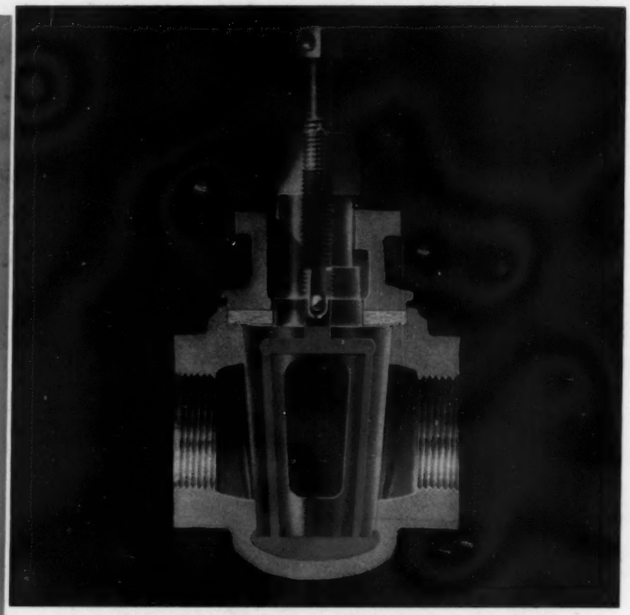
_____

Name_____

Address_____

City_____ State_____

(Use separate sheet if several slogans are submitted)



These Valves Won't Leak - Won't Stick
Lubricated

NORDSTROM VALVES are of the plug cock type, with lubrication and lifting features that make them easy and sure of operation. A stick of special "Merco" Lubricant is inserted under the lubricant screw. The latter, when turned, forces the lubricant down and around the plug. Fluid or other material within the line cannot pass around the plug and leak out, or lodge in the seat. The plug is always easy to turn. Made in types and sizes to meet conditions in all industries.

NORDSTROM VALVES

MERCO

2, 3 and 4-way types.
For high or low pressures.
For high or low temperatures.
Special lubricant for special conditions.
Sizes ½" to 30"
Ask for Catalog.

Merco Nordstrom Valve Co.

SUBSIDIARY OF THE MERRILL COMPANY

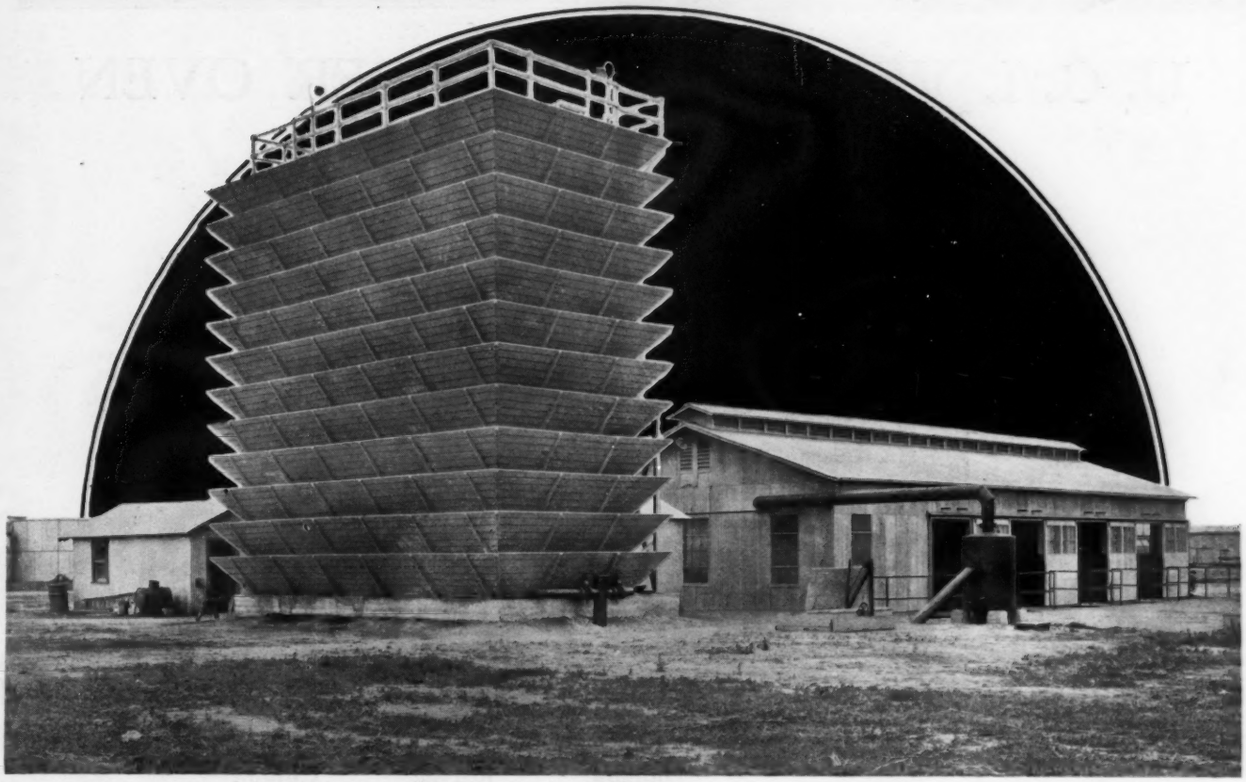
Engineers - Manufacturers

Atlanta: Healey Bldg.
Boston: 184 Boylston St.
Buffalo: Genesee Bldg.
Chicago: 176 W. Adams St.
Dallas: Magnolia Bldg.
Detroit: 2842 W. Grand Blvd.
El Paso: 111 S. Virginia St.
Houston: Petroleum Bldg.
Los Angeles: 556 S. San Pedro St.
New Orleans: Masonic Temple Bldg.
New York: 11 W. 42nd St.
Pittsburgh: Clark Bldg.
Portland: Buyers Bldg.
San Francisco: 343 Sansome St.

AGENCIES IN PRINCIPAL CITIES

***Factories*—Oakland, California; and Belleville, New Jersey**
***Canadian Manufacturers*—**
Peacock Bros., Ltd., Montreal, Cobalt, Winnipeg, Vancouver
***England*—Audley Engineering Co., Ltd., Newport, Shropshire**
Buenos Aires, Argentine—General Electric, Soc. Anon., Victoria.618 Esq. Peru.

"In the event of a tie for any of the prizes offered, each winner of the respective award will receive the same cash amount."



FLUOR Experience

40 years of successful construction experience devoted largely to compression and absorption plants.

"A Fluor Installation"
symbolizes an unquestioned standard of quality.

Speed and a rigid quality of workmanship are assured by modern facilities, organization, and specialized engineering knowledge, gained through years of experience.

A complete design and construction service at your disposal.

FLUOR CONSTRUCTION COMPANY

Compression Plants—Absorption Plants—Heavy Construction

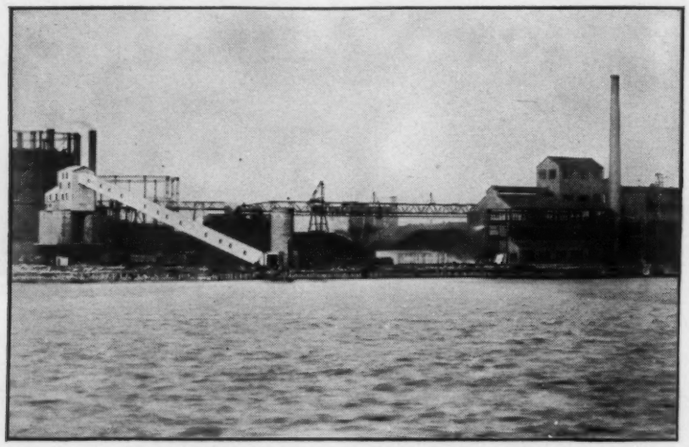
Cooling Towers

Main Office and Plant

909 E. 59th Street, Los Angeles, California
Branches: Tulsa, Dallas, Chicago, New York

October, 1929, Volume V, Number 10. WESTERN GAS is published by Western Business Papers, Inc., at 124 West Fourth Street, Los Angeles, California. Subscription price (in advance) 20 cents the copy; $2.00 per year; 3 years $5.00; $3.00 per year foreign. Entered as second class matter June 1, 1925, at the postoffice at Los Angeles, California, under the Act of March 3, 1879.

U. G. I. VERTICAL CHAMBER OVEN



Wisconsin Gas and Electric Company at Racine, Showing U. G. I. Vertical Chamber Oven plant

AVERAGE OPERATING RESULTS

	Dubuque	*Racine*	*Clinton*
Daily capacity — cu. ft.	698,000	3,030,000	594,000
Corrected Gas in cu. ft. per lb. of dry coal—	6.44	7.64	6.85
per ton of dry coal—	12,880	15,280	13,700
Heat units in gas per lb. of dry coal — B. t. u.	3,605	4,005	3,721

THE U. G. I. Vertical Chamber Oven is the latest advance in carbonizing equipment for gas company use and offers these advantages:

Designed for the manufacture of gas with coke as a by-product

Produces domestic coke of the highest quality

"Steaming" gives dilution without addition of inerts

Flexibility of operation with coal gas heating

Low maintenance due to low operating temperatures, rugged construction and gravity discharge

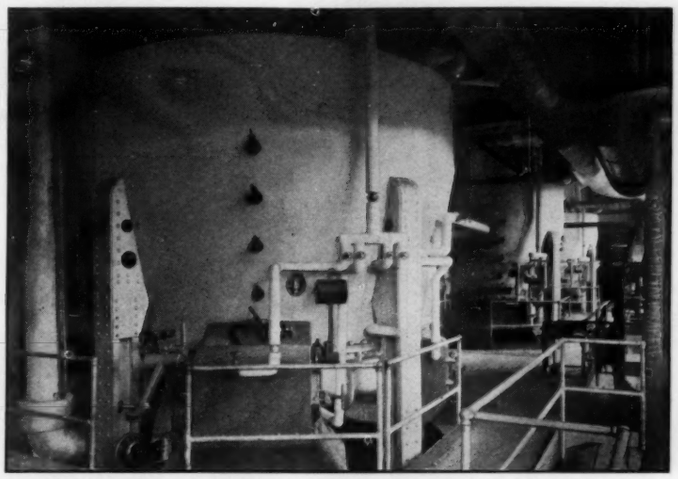
Low labor cost due to simplicity of operation and regulation

High capacity per square foot of ground space

U. G. I. Vertical Chamber Ovens have been installed at Racine, Wis., Dubuque, Ia. and Clinton, Ia. and are under construction at Bangor, Me. and at Racine (second unit).

Visit Booths 731 to 739 at the A. G. A. Convention

U. G. I. MECHANICAL GENERATOR



Three U. G. I. Mechanical Generators at Philadelphia Gas Works Company

Results from the operation of three U. G. I. Mechanical Generators at Philadelphia

Daily Capacity	*Generator Fuel per M.*	*B. t. u. of Gas*
15,000,000 cu. ft.	*25 lbs.*	*530*

THE U. G. I. Mechanical Generator offers the following important advantages:

Continuous operation for extended periods
Low fuel consumption
Low carbon loss in ash
Low maintenance
Heat otherwise lost recovered as steam
Bituminous coal may be used as fuel

The U. G. I. Mechanical Generator is self-clinkering, and with the U. G. I. Automatic Charger, provides a completely automatic controlled and operated water gas set from fuel bin to ash car.

Fifteen U. G. I. Mechanical Generators and nine U. G. I. Automatic Chargers have been installed or are now in process of installation.

THE U. G. I. CONTRACTING COMPANY

DIVISION OF

UNITED ENGINEERS & CONSTRUCTORS

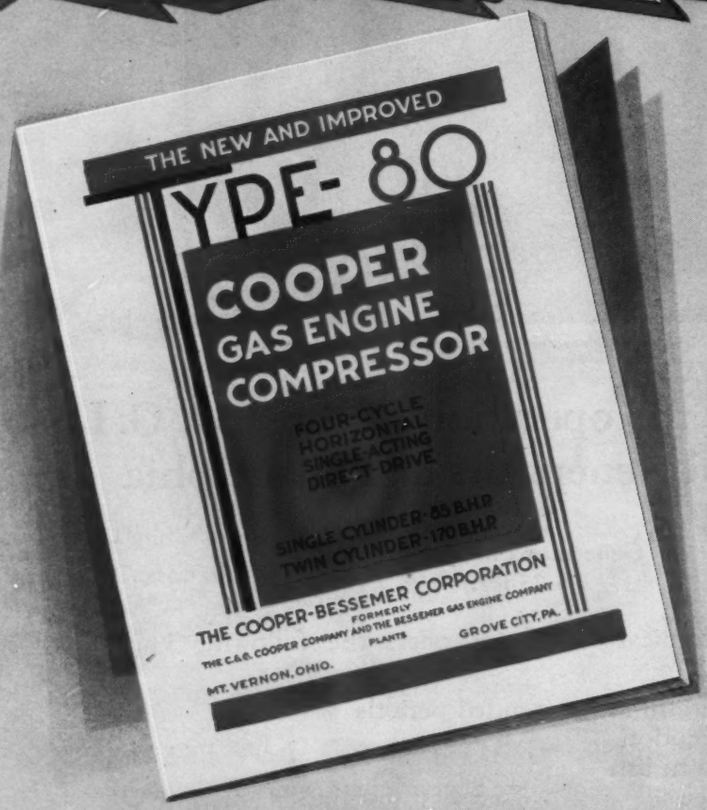
INCORPORATED

DWIGHT P. ROBINSON, PRESIDENT

Chicago **Broad and Arch Streets, Philadelphia** **New York**

MAXIMUM RETURN TO CLIENTS PER DOLLAR INVESTED

Whether You Need Type 80's Now or Not *You'll Want This* BULLETIN.



FOR many important gas and oil field operations the new Cooper Type-80 gas engine compressor has proved its superiority.

A bulletin completely describing this improved engine has just been published. Features of design and construction are explained and illustrated. Installation photographs in well known compressor stations show some of the principal applications.

Because of the leading position of the new Cooper Type-80 for gas compressor service all gas and oil men who have engine-buying responsibilities should have a copy of the new bulletin.

A request will bring a copy by return mail.

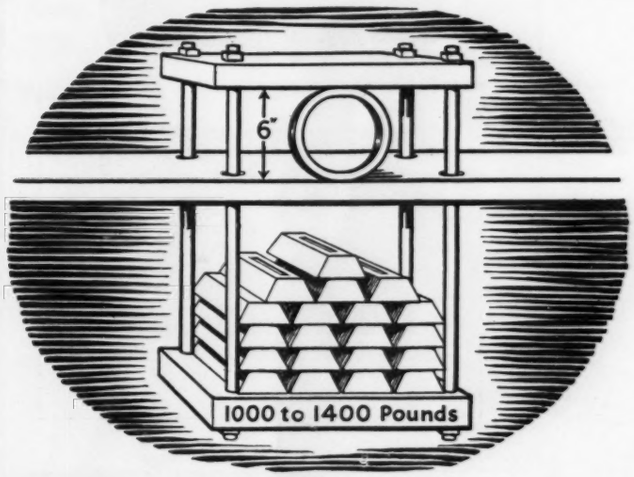
THE COOPER-BESSEMER CORPORATION

Formerly The C. & G. Cooper Company and The Bessemer Gas Engine Company

Mount Vernon, Ohio Grove City, Pennsylvania

Branch offices in all principal oil and gas fields

A deLavaud pipe section
one inch wide will support
a load of from 1000 to 1400 lbs.



THE remarkable ability of deLavaud Pipe to withstand severe crushing strains was demonstrated in a ring-crushing test. This test was conducted by a recognized authority, whose report reads in part as follows:

"Six rings, two each cut from the bell end, the middle, and spigot end of a length of deLavaud pipe picked at random from the manufacturer's stocks, constituted the test samples. These were cut from the pipe band on a lathe and were one inch wide. These rings were quite elastic and the metal appeared to be of a good smooth even grain. Results showed that the load required to cause failure was from 1000 to 1400 lbs."

The facts about deLavaud's great strength are accepted in engineering circles everywhere. It has been definitely proved that deLavaud has 25% greater resistance to internal pressure than good pit cast pipe. The above tests demonstrated deLavaud's ability to withstand tremendous *external* crushing strains.

Those who would know the secret of deLavaud's greater strength need look no further than the microstructure of the metal itself. It is even, close grained and free from slag and blow holes. It is made by pouring molten iron into a rapidly revolving cylindrical mould. Centrifugal force holds the metal against the mould, and drives impurities out *with a force 40 times greater than gravity.*

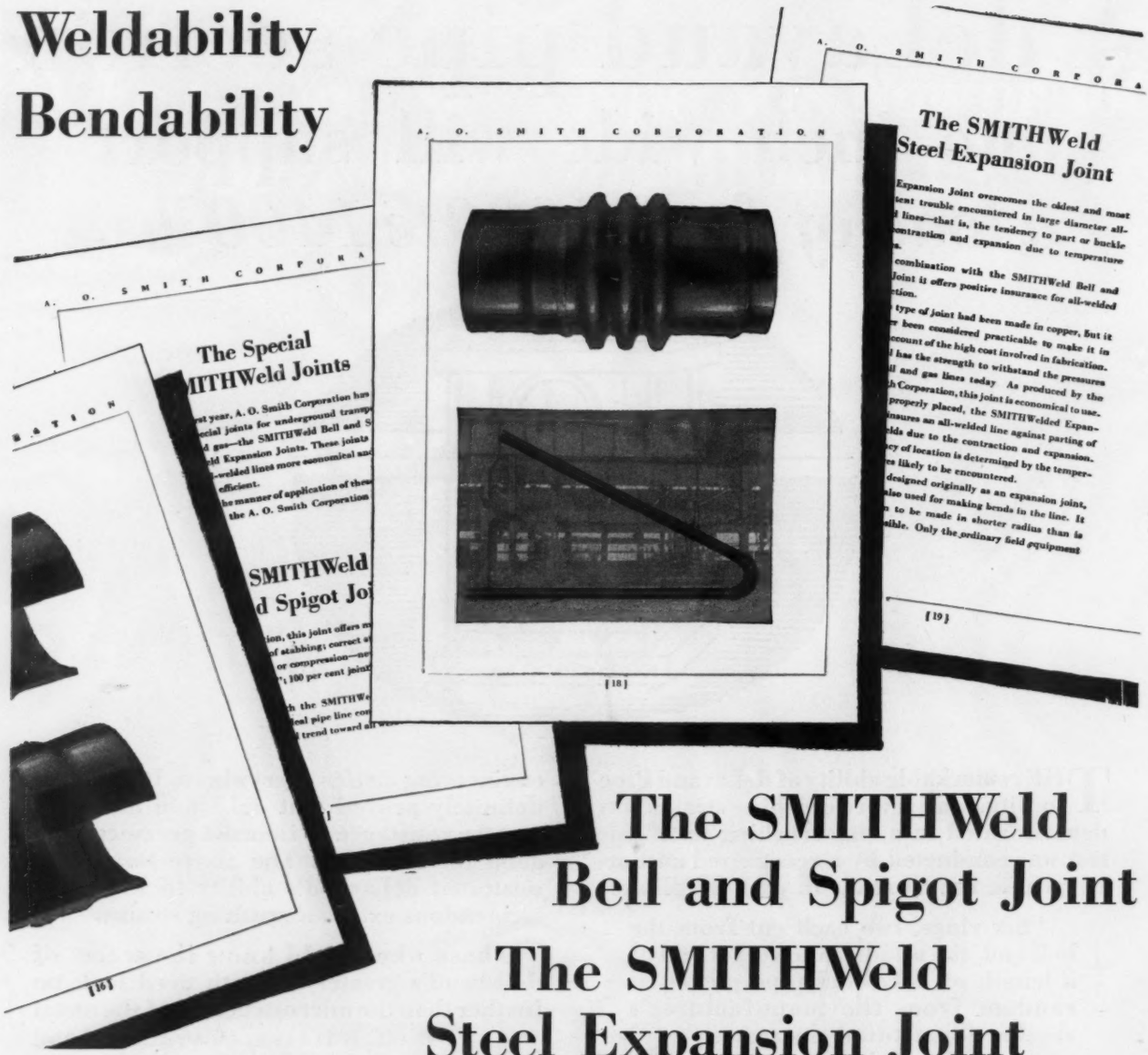
Cast iron pipe made by this Company bears the "Q-check" trademark of The Cast Iron Pipe Research Association.

Let us send you the deLavaud handbook and complete facts and figures about deLavaud Pipe.

United States Pipe
and Foundry Co., Burlington, New Jersey

Sales Offices: New York, Philadelphia, Pittsburgh, Cleveland, Buffalo, Chicago, Dallas, Birmingham, Kansas City, Minneapolis, Seattle, San Francisco, Los Angeles

Weldability
Bendability



The SMITHWeld Bell and Spigot Joint

The SMITHWeld Steel Expansion Joint

Are four of the 44 interesting subjects dealt with in our new book on SMITHWelded Oil and Gas Line Pipe entitled—"The New Way"—the story of pipe production at 25 miles per day.

It also contains valuable engineering data on the application of SMITHWelded Line Pipe and the SMITHWeld Special Joints.

We will gladly send a copy to anyone interested in Oil and Gas Field Underground Transportation.

A. O. SMITH CORPORATION

Oil and Gas Field Products Division

General Offices: MILWAUKEE, WISCONSIN

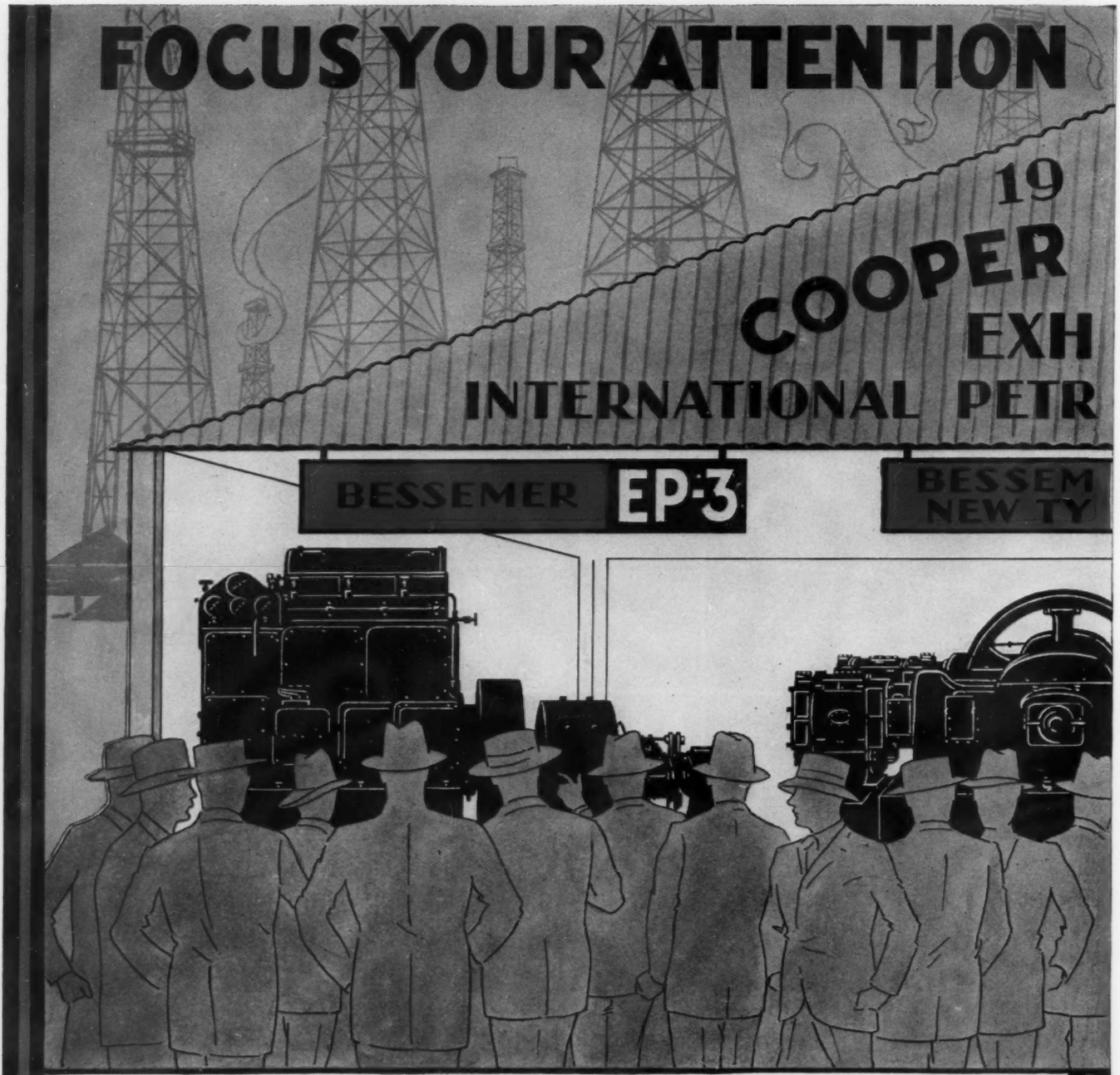
District Offices at New York · Tulsa · Houston · Los Angeles

SMITHWELDED LINE PIPE

10,000,000 Cu. Ft. Gas Holder—San Francisco, Cal.

IMUNOL A ***for outside protection and appearance***
IMUNOL B ***for interior protection***
IMUNOL B ***for dry storage of dehydrated or natural gas***
IMUNOL B ***for protection of under-water metal surfaces***

INERTOL CO., Inc., 253 Broadway, New York, N. Y.
Representative for Mountain and Western States:
B. W. MUELLER, 447 Sutter St., San Francisco, California



THE engines chosen for exhibit this year represent three of the important phases of gas and oil field engine service.

Bessemer Type-OF engines have been one of the leaders in pumping and drilling work. The new type on display, however, is radically different from the one so well known. Because of the many improvements it was necessary to change the design itself.

In many fields for gas compressor service Bessemer Type-10's have been considered standard. After careful observation of this engine in operation certain changes were decided upon. The engine on exhibit is so different that it is called the new Type-10.

Nearly as important as the main engines, are the auxiliary power units. The dependable performance of Bessemer Type-EP-3's has established their reputation for this service. The engine, which is a full Diesel, direct drives the electric generator. This unit will be new to many oil and gas field men.

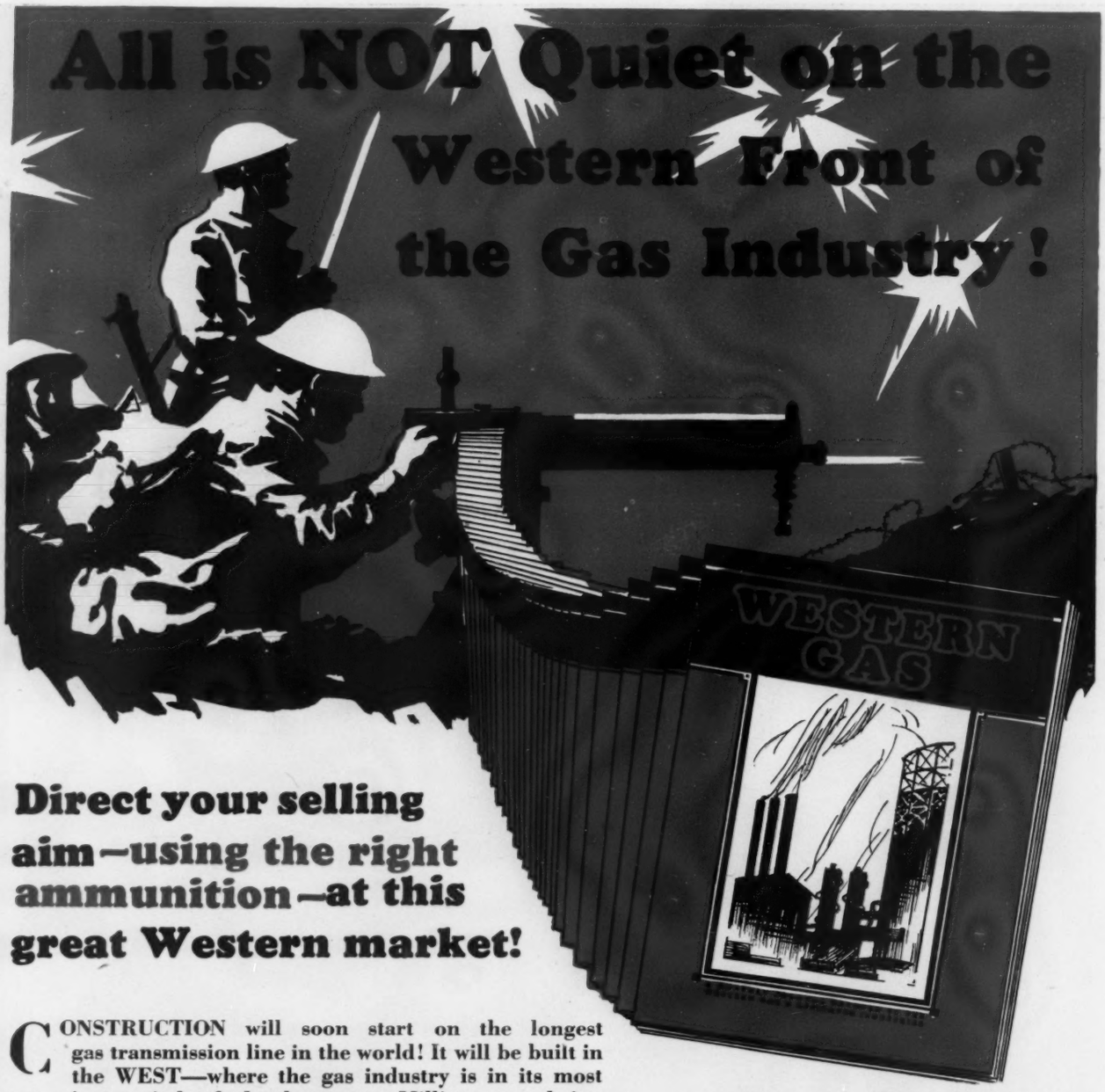
There will be many interesting exhibits at the exposition but few will have the focus of attention of these improved engines.

THE COOPER-BESSEMER CORPORATION

Formerly The C. & G. Cooper Company and The Bessemer Gas Engine Company

Mount Vernon, Ohio Grove City, Pa.

Branch offices in all principal oil and gas fields



Direct your selling aim—using the right ammunition—at this great Western market!

CONSTRUCTION will soon start on the longest gas transmission line in the world! It will be built in the WEST—where the gas industry is in its most extensive period of development. Millions are being spent for materials and equipment and all types of gas burning appliances are in great demand. This is the territory (all states west of the Mississippi) in which WESTERN GAS has MORE CIRCULATION THAN ALL OTHER GAS INDUSTRY PUBLICATIONS COMBINED! Is it any wonder that manufacturers are using 40 per cent more space in WESTERN GAS this year than in 1928? It's PROVEN PROFITABLE, that's why!

WESTERN BUSINESS PAPERS, INC.

Publication Office:
124 West Fourth Street
Los Angeles, Calif.

447 Sutter Street
San Francisco, Calif.

307 Thomas Building
Dallas, Texas

Gas Sales Increase in Six Months-1929

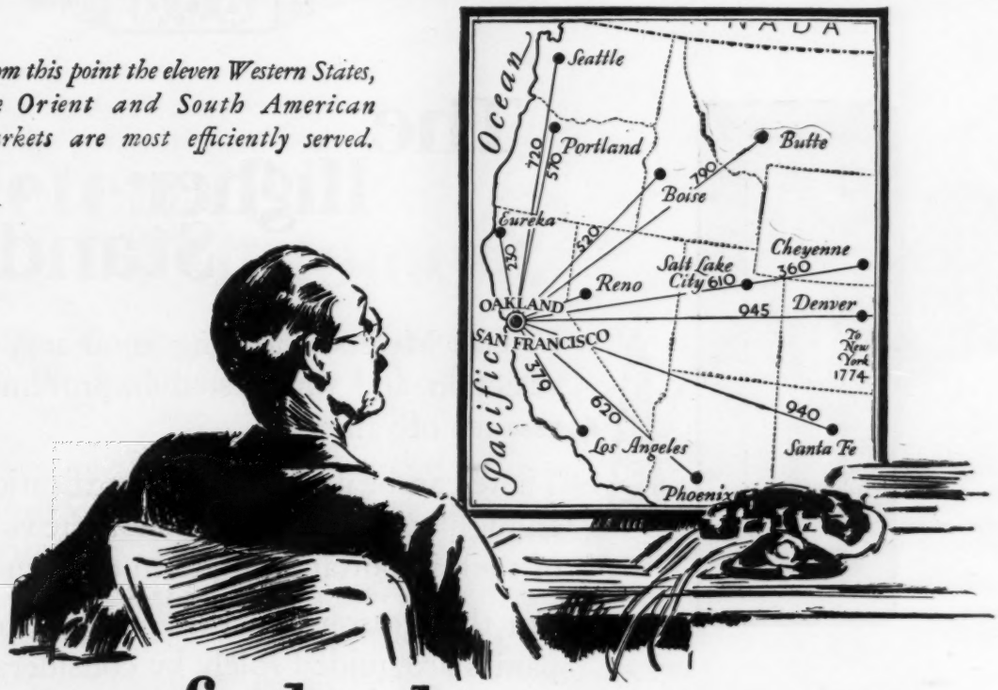
New England	5.6%
Middle Atlantic	1.2%
South Atlantic	2.0%
East North Central	9.9%
West North Central	2.9%
South Central and Mountain	54.9%
Pacific Coast	20.8%

Territory covered by Western Gas is shown in Red!

WESTERN GAS

NATURAL GAS IS NOW AVAILABLE FOR INDUSTRIES

From this point the eleven Western States, the Orient and South American markets are most efficiently served.



A new fuel....low power costs *in the* San Francisco Metropolitan Bay area

This is one of the fastest growing industrial centers in the country. Many national concerns have located here and many more are coming. Here you find low power costs and an abundant supply of natural gas at attractive low rates. There is ample supply of skilled and unskilled labor with unusually low turnover largely due to the high percentage of home ownership. A splendid working climate of 57.1°F. mean annual temperature. There are over 100 miles of waterfront within the industrial area. Acreage of any desired size can be had at considerably less cost than elswhere. Here, too, building costs are relatively low. Here you will find promptly available raw materials in wide variety and great abundance.

Distributors or manufacturers interested in the great western markets are invited to write for any general or specific information with the assurance of the correspondence being held in strictest confidence. Send for a copy of "Outstanding Features of the P. G. and E."

PACIFIC GAS AND ELECTRIC COMPANY

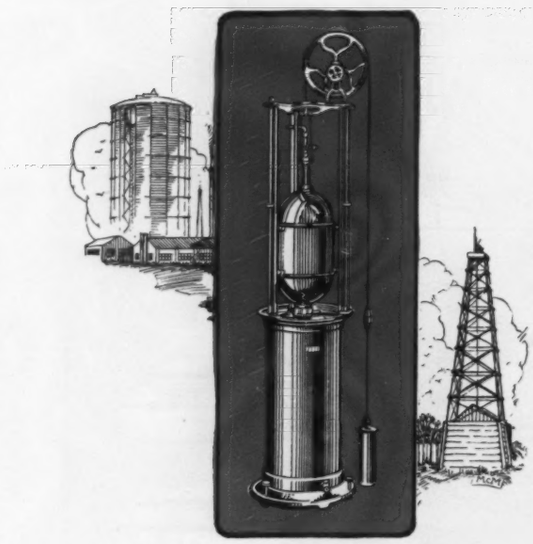
P·G·and E·

Serving 349 Communities in Northern and Central California

One of a series of advertisements appearing in seven National Magazines

Ind. No. 3

KNOWN FACTORS CUBIC FEET IN METER VALUE



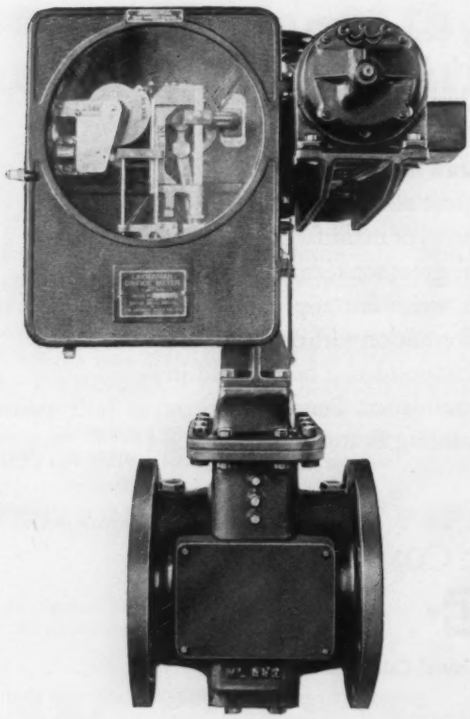
The Higher Standard

In Gas Meters, enduring accuracy, quality construction and time-tested improvements are the essence of value.

There can be no economic justification for "good enough" or experimentation in the volume buying of such important long-term equipment.

For that reason, the vast majority of Gas Companies are guided solely by considerations of *true economy* in the purchase of Gas Meters.

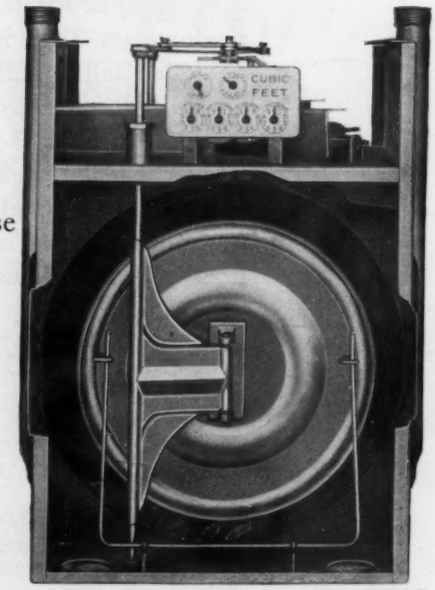
LARGE VOLUME MEASUREMENT
LINDERMAN METERS



AMERICAN METER COMPANY
JOHN J. GRIFFIN & COMPANY
HELME & McILHENNY
MARYLAND METER WORKS
D. McDONALD & COMPANY
METRIC METAL WORKS
NATHANIEL TUFTS METER WORKS
PACIFIC METER WORKS

AMERICAN METER CO. MEASUREMENT ENGINEERS CUBIC FEET

A-TYPE METERS
Tinned Steel Case



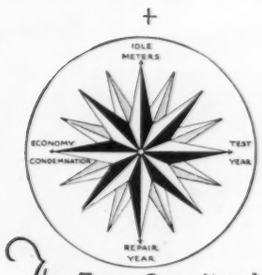
KNOWN FACTORS CUBIC FEET IN METER VALUE

In Meter Equipment

American Meter Company Gas Meters are unsurpassed in all the advantages that make for *true economy:*

Up-to-date quality, ample capacity, and an unmatched record for accurate and reliable performance, distinguish every type and model.

Long experience, nation-wide service facilities, manufacturing integrity—in fact all the qualifications that have brought world leadership in Gas Measurement Engineering—distinguish the manufacturer.



The Four Cardinal Points—a guide to effective Meter Maintenance or larger returns on Meter Investment

AMERICAN METER COMPANY

INCORPORATED

The World's Largest Manufacturers of Gas Meters and Allied Apparatus

ESTABLISHED 1836

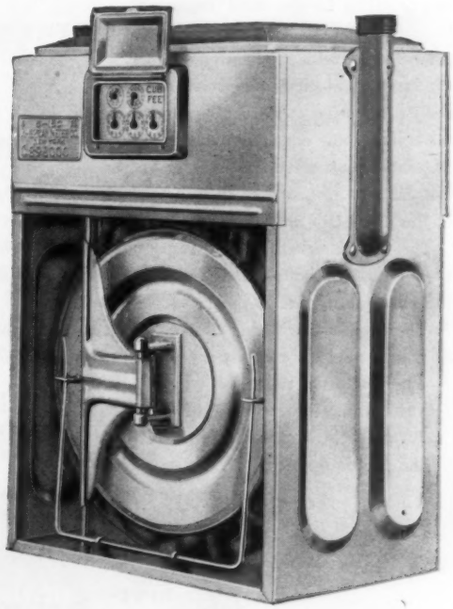
General Offices: 105 West 40th Street, New York City

IRON CASE METERS

For Low, Medium, and High Pressures

B-TYPE METERS

Tinned Steel Case



BITURINE COATINGS

Biturine Enamel *Biturine Solution No. 5*
Biturine Enamel Primer *Biturine 70-30*
Biturine Coupling Mixture

This group of protective coatings represents the fruits of more than 20 years of careful research and practical experience. Biturine Enamel and Primer are particularly adapted to the Hill, Hubbell & Company process of mechanically applying protective coating to the pipe at the mill.

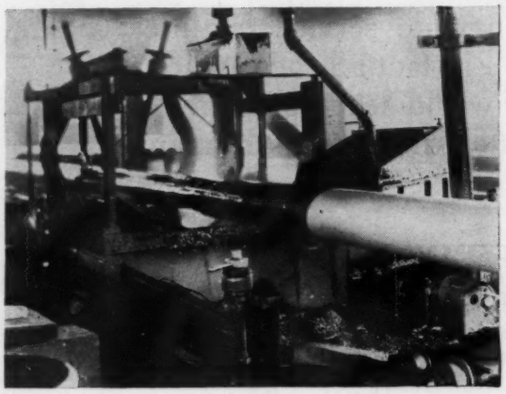
Mechanically coated and wrapped pipe. The newest development in pipe line protection

Now you can buy line pipe mechanically coated and wrapped *at the mill.* No longer need the laying of new lines or the renewal of old ones be subject to the hazards and delays caused by the old method of applying the protective coating in the field. Your pipe is delivered to you ready to lay, fully protected by the Hill, Hubbell & Company process of coating the pipe and wrapping it at the mill.

It is generally accepted by authorities that *proper application* of pipe line coating is the most important feature in the success of any form of protection. Field applications under the most ideal conditions have never been productive of a 100% satisfactory job in all cases, owing to the unfavorable conditions under which the work had to be carried on—inclement weather—unskilled labor—varying temperatures—the difficulty of properly cleaning the pipe and applying the coating of the protective material so as to cover the surface thoroughly.

The Hill, Hubbell & Company process of mechanical application at the mill eliminates all these difficulties, and presents the following outstanding advantages:

1. The pipe is thoroughly cleaned of all rust and mill scale.
2. It is not only thoroughly dry but warm when the primer is applied.
3. The required thickness of the protective coating of Bitumen is applied *before* the felt is applied.



The Coating and Wrapping of the Pipe is a Continuous Mechanical Process

4. This thick coating is applied in two coats, insuring freedom from pin holes and bubbles.
5. The coating of felt is applied under tension and is exactly spaced and, therefore, perfect.
6. The whole process is mechanical, involving no human element, and no waste.
7. The entire operation goes on under roof and can proceed night and day regardless of weather.
8. Exact temperature control of the Bitumen is possible. This is important and cannot be had in field operations.

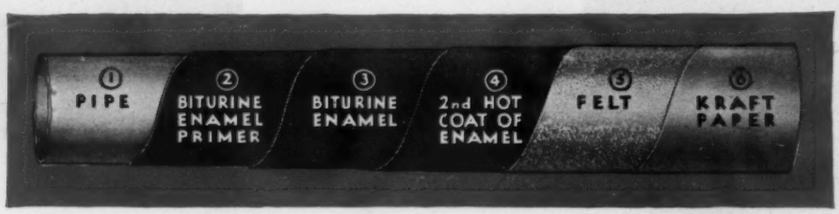
Plants for the mechanical coating and wrapping of pipe are located in the following cities for the production of the pipe manufacturers listed.

Central Tube Company, Ambridge, Pennsylvania; Spang-Chalfant & Company, Ambridge, Pennsylvania; Youngstown Sheet & Tube Company, Indiana Harbor, Indiana; National Tube Company, Lorain, Ohio; A. O. Smith Corporation, Milwaukee, Wisconsin; Youngstown Sheet & Tube Company, Youngstown, Ohio.

Others are contemplated and will be installed in the near future. Each of these plants is equipped to handle pipe up to 24 inch diameter and to conform to specifications covering a wide range of combinations of materials.

GENERAL PAINT CORPORATION
HILL, HUBBELL & COMPANY DIVISION
CHICAGO NEW YORK TULSA HOUSTON SAN FRANCISCO OAKLAND
LOS ANGELES PORTLAND SEATTLE SPOKANE

Write to our nearest office for literature descriptive of the process and for details regarding specifications.



Hill, Hubbell & Company Machine Coated and Wrapped Pipe is Your Best Insurance Against Corrosion

A Winter Message—"Turn on the Sun"

Millions of gas users and potential gas users are reading in the national magazines the General Gas Light Company's message—"Turn on the Sun."

A new note is sounded. Gas heat, as emanated from the Humphrey Radiantfire, is not only healthful, but health-giving heat. This radiant heat contains an abundance of the vital infra-red rays, and some of the ultra-violet rays of summer sunshine.

To the entire gas industry a new sales appeal is added, Health and Heat from one appliance. It has been called, and rightfully, the most important modern development in the gas-heating world.

The HUMPHREY Radiantfire

TRADE MARK REG. U.S. PAT. OFF.

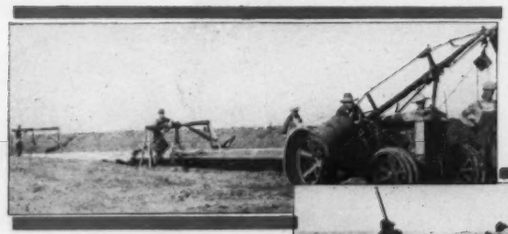
Manufactured by
General Gas Light Co.,
Kalamazoo,
Michigan

Pacific Coast Manager
C. B. Babcock,
135 Bluxome St.,
San Francisco

Engineers can't all be wrong when they demand

PROOF!

PROVEN PROTECTION FOR PIPE LINES

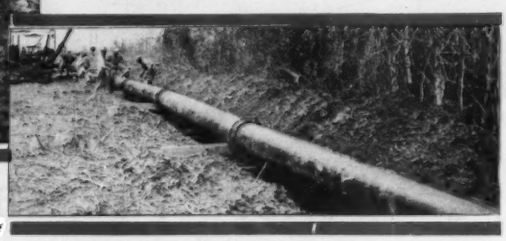


On the Amarillo-Denver line 87% of the protective coatings used were **Bitumastic** products.

Four hundred miles (95%) of the Empire Line between Pampa, Texas and Kansas City are coated with **Bitumastic Enamel.**

Even though Bitumastic Enamel may not be used for the entire length of a long line, it is almost always selected for the stretches where the soil is most corrosive

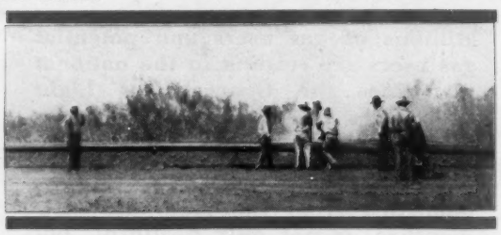
And now the major portion of the new St. Louis line is being coated with **Bitumastic Enamel,** particularly on those sections where soil conditions are most severe.



The most difficult soil conditions on the Memphis Line were met by coating 160 miles with **Bitumastic Enamel**

These long pipe lines cost too much to take chances on the protective coatings. The selection of proper and adequate protection from among the many kinds offered requires clear thinking and close application to the study of proven facts.

The time-tested performance of **Bitumastic Enamel** on thousands of miles of oil and gas lines has led hundreds of Engineers to choose it for important lines in preference to all other protective coatings. Time after time in the face of severe price competition **Bitumastic Enamel** has been used because it is the one protective coating which has proven its protective qualities over a period of years. When mile after mile on job after job are coated with **Bitumastic Enamel** the Engineers who choose it can't all be wrong.



The entire 500 miles of the Atlantic Oil Line from Midland to Port Arthur, Texas, are coated with **Bitumastic Enamel.**

BITUMASTIC

REG. U.S. PAT. OFF

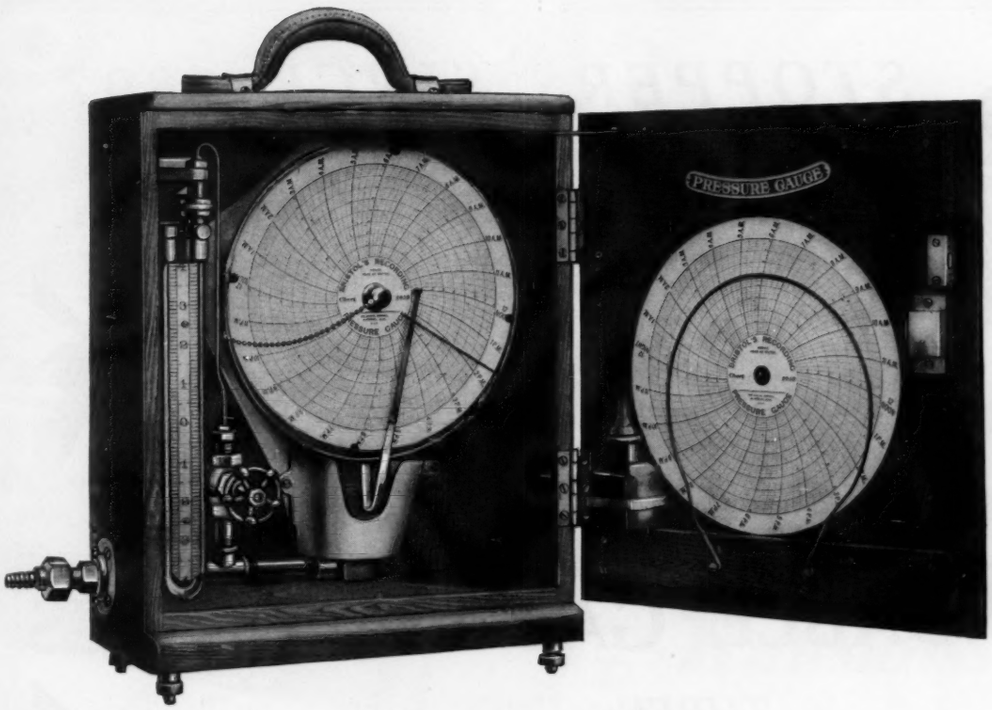
ENAMEL

Wailes Dove-Hermiston Corporation

17 Battery Place, New York

2464 Enterprise St., Los Angeles, Calif. 345 Vermont St., San Francisco, Calif.

Philadelphia Cleveland Chicago Houston Tulsa San Francisco



The Bristol's Portable Type Recording Pressure Gauge shown here consists of a pressure-measuring element, securely mounted inside a wooden protection case. The case is strongly constructed of light weight wood and has leather handle for carrying. Space is provided inside the door for extra charts, ink, etc. Also included is a U-tube to facilitate checking the accuracy of the recorder. Uses 12 or 8-inch charts to provide 24-hours or 7-day records. Inherent ruggedness and accuracy under all conditions makes this an ideal instrument for general test purposes.

When Your Customers Complain of low pressures

MANY leading gas companies have found that it pays handsome dividends to answer pressure complaints "with actual FACTS"—rather than vague argument; by so doing they avoid misunderstanding and strained public relations.

These **facts** are obtained with a Bristol's Portable Recording Pressure Gauge, which, when installed in the line at customers' premises, makes a continuous automatic record of pressures delivered at that point over a period of several days or weeks, as desired.

Such records are entirely automatic. They tell a true, unbiased story of exact pressures maintained. A story which is easily explained, and readily understood.

This same type of Gauge can be used to locate other distribution trouble, such as leaks and water in the line.

Write for complete information, prices, etc.

The Most Extensive Line of Recording, Indicating and Controlling Equipment for the Industries, including:

Pressure and Vacuum Gauges; Liquid Level Gauges; Electrical Boiler Water Level Gauges; Recording Thermometers; Indicating and Recording Pyrometers; Recording Psychrometers; Recording Electrical Instruments (including Voltmeters, Milli-Voltmeters, Ammeters, Milli-Ammeters, Shunt Ammeters, Wattmeters, Frequency Meters); Mechanical Motion Recorders; Electrical Operation Recorders; Indicating and Recording Tachometers; Engine Counters; Revolution Counters; Averaging Instruments; Gaugeboard Clocks. Also equipment for automatically controlling Temperature, Pressure, Liquid Level, Liquid Flow, etc.; together with Motor Operated and Solenoid Controller Valves, and Control Panels.

Engineering Service

Bristol's Engineering Service is at the disposal of any organization desiring to make a survey of instrument possibilities, or adapting Recorders or Automatic Control Instruments to new developments. There's no obligation entailed.

The BRISTOL Company

WATERBURY CONNECTICUT

Branch Offices:

RIALTO BLDG., SAN FRANCISCO

Boston	Philadelphia	Birmingham	Detroit	Denver
New York	Pittsburgh	Chicago	Akron	St. Louis

STOPPERS SINCE 1897

The Goodman Stopper

WITH improvements from time to time, now has as its newest feature, the "Z" handle, for easier manipulation. The upper crotch of the "Z" handle engages in the tap-hole and enables the operator to place the Stopper properly and instantly. The LOCKING SLEEVE then HOLDS it securely in place.

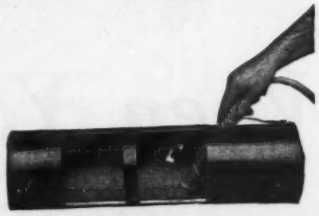
Cross-bars backing up the diaphragm prevent "bellying" on the larger sizes, 12" and up. Specify on order if desired.

Patented Locking Sleeve

DEPENDABLE GAS MAIN BAGS

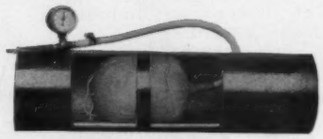
THREE TYPES

Type "C" Bags



FOLD it and WRAP it and DROP it in PLACE

CANVAS-covered, for use in mains coated with tar or oil or wherever a plain rubber bag will not hold. The cover is treated to resist the action of tar and oil, and this bag IS USED IN OIL LINES while welding is being done. Meets many conditions.



OUR PUMP WILL BREAK THE CORD

Carried in stock 2" to 48". Size 12" and larger furnished with valves. Valves on smaller sizes, IF SPECIFIED, on order.

PLUGS FOR MANY USES

1897

We Will Be at Booth 730 in Atlantic City

1929

SAFETY GAS MAIN STOPPER CO.

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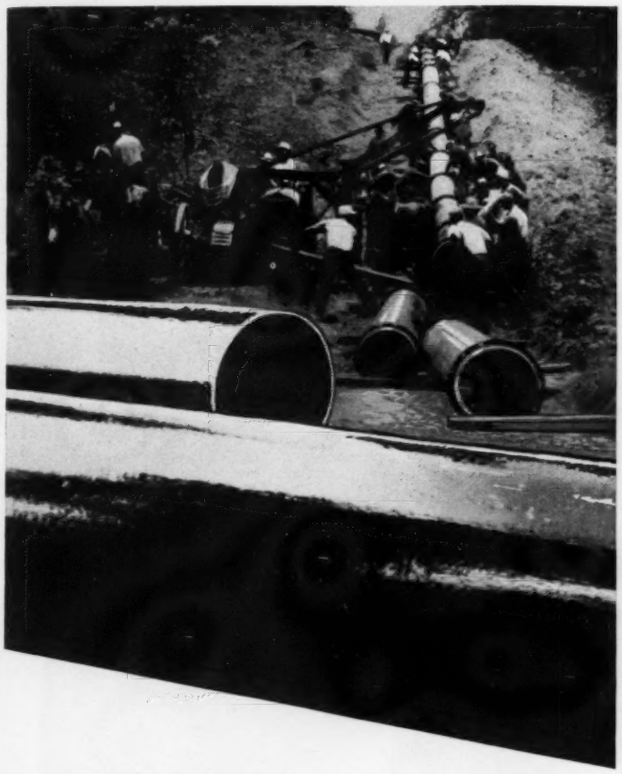

Fighting Corrosion on Mississippi Valley Transmission Line

Above, you see a section of the line about to be lowered in the trench. The inset is a close-up of pipe that has been treated. Note the smooth, tough surface which won't crack or chip during backfilling and resists injury from soil pressure.

ON 25 miles of a big 22-inch transmission line in the Mid-Continent region, the Mississippi Valley Fuel Co. is depending on McEverlast to prevent corrosion.

On this job, as in the majority of cases, McEverlast coatings are applied cold. No risk of burning accidents which might delay the work. Needs only a small crew to make the applications. A penetration coat is first applied which seals all pores in the metal, drives air from the pockets and forms a perfect bond. Two electrolysis-proof coatings follow this and the pipe is ready to bury.

In good soil conditions, this treatment does the job well. Where corrosive action is severe, "McEverlast" Osnaburg wrapper is combined with the cold coatings and in extreme conditions a "McEverlast" hot coat is also applied. This gives a complete protection for under-ground lines that is hard to beat!

Let us mail you our illustrated booklet, "Protecting Pipelines and Exposed Metal Surfaces with McEverlast "Protective Coatings." Contains important information on special McEverlast coatings for tanks, concrete foundations and other surfaces.

McEVERLAST, INC.
[T.M. REG.]

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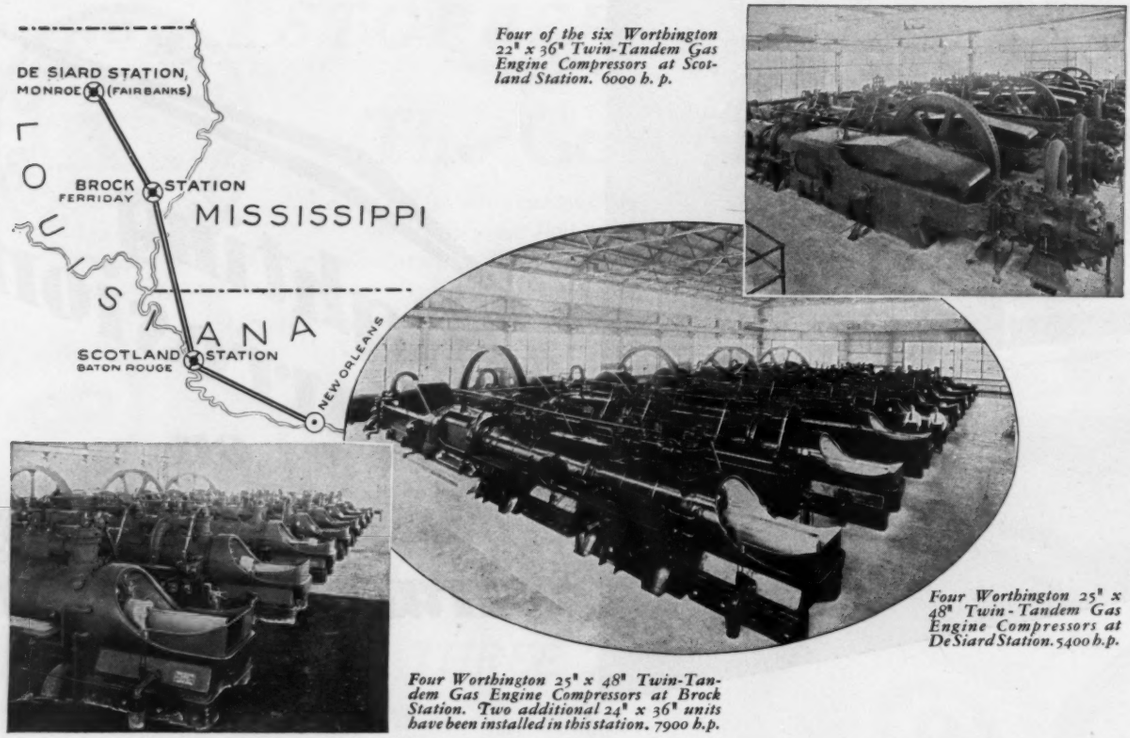

Four of the six Worthington 22" x 36" Twin-Tandem Gas Engine Compressors at Scotland Station. 6000 h. p.

Four Worthington 25" x 48" Twin-Tandem Gas Engine Compressors at DeSiard Station. 5400 h.p.

Four Worthington 25" x 48" Twin-Tandem Gas Engine Compressors at Brock Station. Two additional 24" x 36" units have been installed in this station. 7900 h.p.

19,300 Worthington Horsepower

Pumping Gas from Monroe to New Orleans

THE three compressor stations on the Monroe-New Orleans Pipe Line of the Interstate Natural Gas Company are all equipped with Worthington Twin-Tandem Gas Engine Compressors . . sixteen units developing 19,300 horsepower.

Worthington equipment was selected for this line squarely on its record of ability to operate with steady reliability and low maintenance cost.

As the oldest gas engine builder in the United States, with an installed horsepower of 370,154, Worthington possesses a background of experience that is reflected in every engine produced.

Through their associates, A. M. Lockett and Company, New Orleans, Worthington is equipped to construct pipe line compressor stations, complete in every detail.

Write for a copy of Bulletin S-550-B1. It contains illustrations, sectional views and detailed description of Worthington Gas Engine Compressors.

WORTHINGTON

PUMPS
COMPRESSORS
CONDENSERS *and* Auxiliaries
DIESEL ENGINES
GAS ENGINES
FEEDWATER HEATERS
WATER, OIL *and* GASOLINE METERS

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EGR-3

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WORTHINGTON

DRESSER

Couplings Dominate

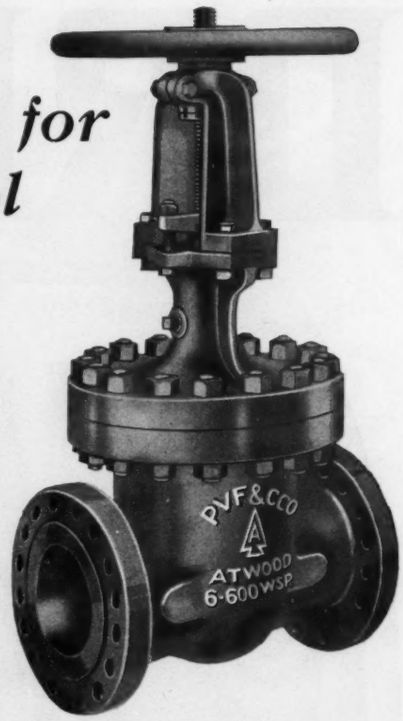
Another Record Breaker

The Mississippi River Fuel Corporation's 22" Natural Gas Pipe Line from Louisiana to St. Louis in capacity and length exceeds all previous installations.

Of course Dresser Couplings were used exclusively, which assures uninterrupted service and minimum maintenance expense.

S.R. DRESSER MFG. COMPANY
BRADFORD, PENNA., U.S.A.

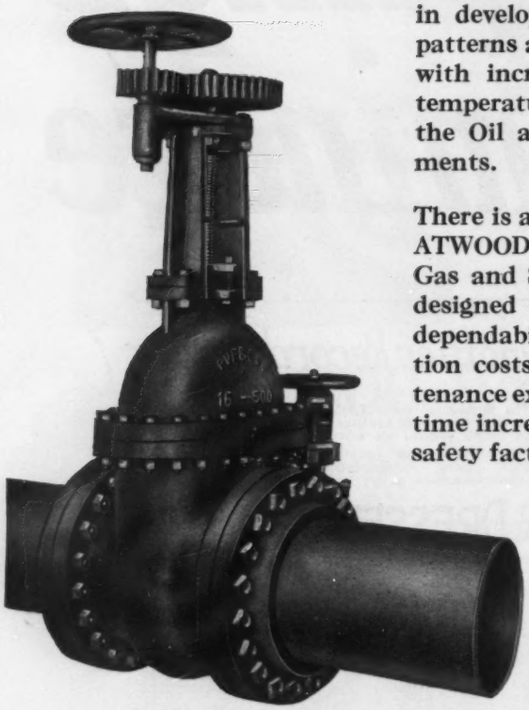
ATWOOD *Equipment for Oil and Gas Control*



6" (Series 60) 1000 lbs. working pressure for oil and gas tested hydrostatically to 1500 lbs. ATWOOD Electric Steel solid wedge Monel mountings.

A TRIP through the Oil and Gas fields reveals ATWOOD Valve Value as the gauge of universal acceptance. This condition is the result of 70 years' research in developing a wide range of patterns and sizes to keep pace with increasing pressures and temperatures in Refineries and the Oil and Gas field requirements.

There is a proper advanced type ATWOOD Valve for every Oil, Gas and Steam line condition, designed to insure guaranteed dependability, reduce production costs by decreasing maintenance expense and at the same time increase efficiency and the safety factor.



16"-500 lbs. working pressure, ATWOOD High Tensile Iron, O. S. & Y. spur gear operated valve, tested hydrostatically to 1000 lbs. Equipped with 4" O. S. & Y. bypass. Welding Nipples made with ATWOOD Joints.

Much more than the ordinary length of service is incorporated in ATWOOD Valves by reason of sturdiness of body derived from castings of either ATWOOD High Tensile Iron or ATWOOD Electric Steel.

Mountings for the rugged ATWOOD Valve body can be furnished in Monel, Stainless Steel or Bronze—according the service required—and are fully guaranteed for that service.

Trade Mark
ATWOOD

Send for ATWOOD Oil & Gas Valve Booklet 100

PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO.

PITTSBURGH ~ PENNA.

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The ATWOOD Line ~ VALVES ▲ FITTINGS ▲ PIPING

FISHER *INSURES*

Proper Seating of Regulator Valve Disc

The 205 Gas Pressure Regulator for house service—with Mercury Seal Relief Valve

More than two years ago, the Fisher laboratory set out to build a really perfect Gas Regulator.

They gave it strength and good looks.

They provided a channel to catch foreign matter.

They used a diaphragm impervious to natural or artificial gas, tar, gasoline and water — a diaphragm that stays flexible through years of active service.

And, so that the valve disc will seat with absolute accuracy, Fisher attaches the valve disc holder to the diaphragm arm, with a removable pin on a pivoted joint. It is completely flexible. Action is free. Seating is *sure*.

How well the Fisher laboratory built the regulator may be judged by the fact that during the life of these regulators little attention has to be paid to diaphragms and discs.

Steam Pump Governors
[10 to 10,000 lbs.]
Boiler Feed Pumps
Fuel Oil Pumps
Vacuum Pumps
Receiver Tank Pumps
Pump By-Pass Valves
electric and power driven pumps
Reducing Valves, Pressure Regulators
for all pressures—liquids, gases, steam
Differential Pressure Regulators
Strainers
pipe, suction and drip pocket
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direct and remote type
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Liquefied Petroleum Gas Regulators
for gas cylinders
Gas Water Traps
Lever Valves
air, gas, or liquid
Float Valves
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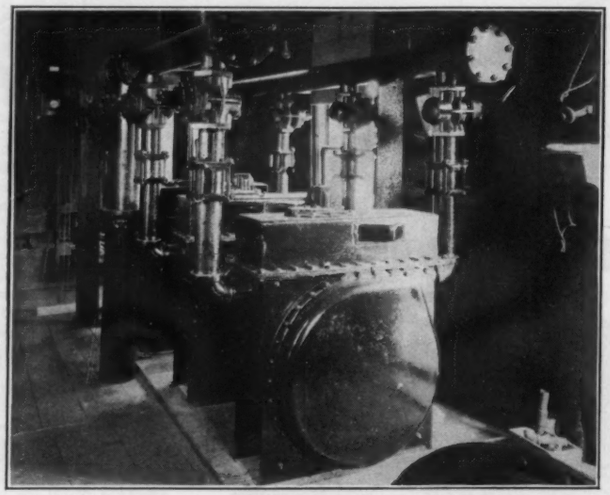
Drip Pockets
Exhaust Heads

The Fisher Catalog is the reference book for steam, water, air, oil, gas and similar fluid controls and related specialties—ask for a copy today. It deals with these products and 1,000 of similar nature.

FISHER

THE FISHER GOVERNOR COMPANY, Inc.

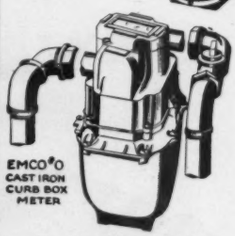
2400 Fisher Bldg.
Marshalltown, Iowa

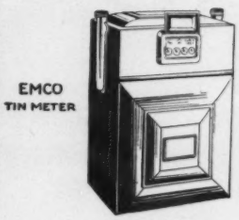


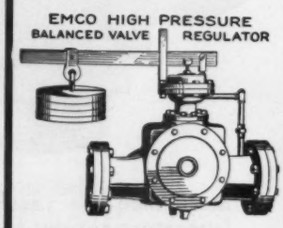
Three Large Capacity Meters Occupy a Small Space When the Meters are EMCO Number Fives

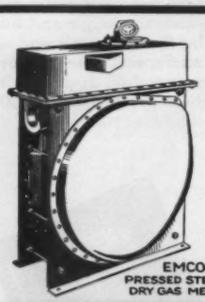
THIS meter requires slightly over four square feet of floor space. The pressed steel construction makes it rigid and is protection against hard jolts or knocks. The EMCO Number Five has a capacity of 10,000 cu. ft. per hour with a pressure drop of less than two inches.

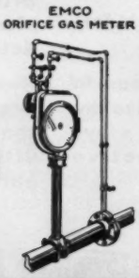
EMCO, *wherever you go.* This installation is in Iowa.

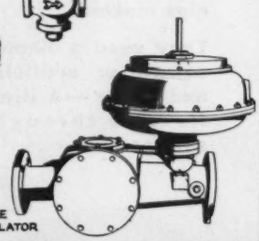












PITTSBURGH EQUITABLE METER COMPANY

MAIN OFFICE AND WORKS PITTSBURGH, PA.

NEW YORK CHICAGO COLUMBIA, S.C. LOS ANGELES DALLAS TULSA SEATTLE KANSAS CITY SALT LAKE CITY

And THERE IS NO SECOND..

LEADERSHIP is the reward of merit. Class wins its way to the top in industrial competition as surely as in sport.

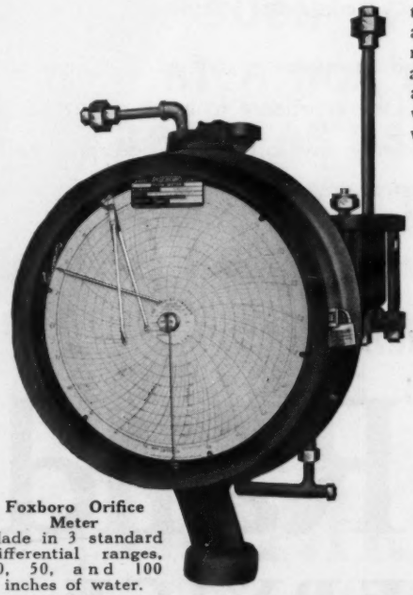
In the oil and gas fields Foxboro with its new Orifice Meter has set the pace. Foxboro is out in front with time-tested features that are unduplicated, with a record of sales that is unequaled, with a list of users that includes the great majority of the leading oil and gas companies in the country.

For those who want the most accurate, most powerful, most dependable Orifice Meter ever built, there *is* no second choice.

STRENGTH

Every part of the new Foxboro Orifice Meter is built to give accurate and reliable service under severe field conditions. Typical are: the dirt-defying inch drop forged steel float, the most powerful float used in any meter, and the extra heavy drawn seamless steel mercury parts—all other parts of the meter are built in harmony. Performance—not alibis—no matter what happens. If *that's* what you want from your orifice meters, write the nearest Foxboro branch office.

See our exhibit at the Sixth International Petroleum Exposition, Tulsa, October 5-12, at Booths 4, 5, and 6.



Foxboro Orifice Meter
Made in 3 standard differential ranges, 20, 50, and 100 inches of water.

THE FOXBORO COMPANY
Neponset Ave., Foxboro, Mass., U. S. A.

Western Offices:
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Portland, Ore., 816 Lewis Bldg.

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J. E. Treacy, Strada Golesti No. 9, Ploesti, Roumania

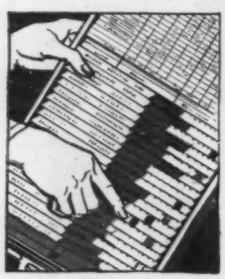
Agents for Robinson Patented Orifice Flange Fittings

FOXBORO
REG. U. S. PAT. OFF.
THE COMPASS OF INDUSTRY

Instruments for Controlling, Recording and Indicating Temperature, Flow, Humidity and Pressure

No Customer Ever Leaves this Counter with a Grievance

SERVICE observers of a mid-west utility reported that most customer complaints were traceable to faulty records. Flagrant cases of record errors were found in the Service Application Department. Mistakes in addresses and account numbers ... duplications ... misspelled names.



Remington Rand was asked to help. Their Representative, a public utility accounting specialist, completed an exhaustive survey . . . suggested a remedy.

The new system brought order out of chaos. *Record control* was established for the service, credit and collection departments. Service to customers speeded up . . . time and labor saved . . . errors reduced to a minimum . . . credit losses stemmed.

Remington Rand maintains a staff of specialists who are qualified by long experience to assist public service companies in solving any sort of record-keeping problems. Their services are yours for the asking—without cost or obligation.

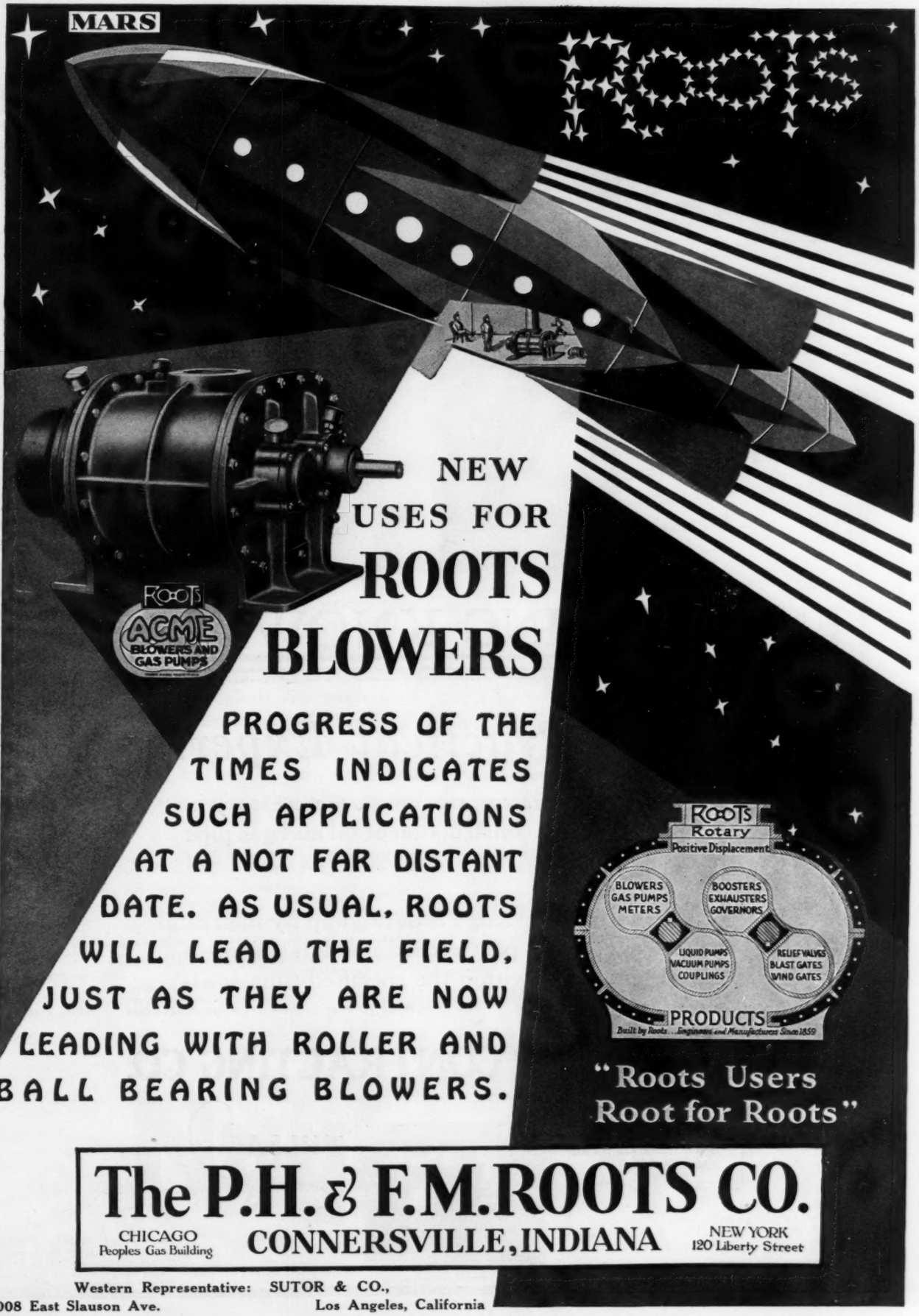
Public Utility Department

Remington Rand

BUSINESS SERVICE

BUFFALO, NEW YORK

W. G. 10-29



The P.H. & F.M. ROOTS CO.

CHICAGO
Peoples Gas Building

CONNERSVILLE, INDIANA

NEW YORK
120 Liberty Street

Western Representative: SUTOR & CO.,
2008 East Slauson Ave. Los Angeles, California

Scene on St. Louis Monroe 22" line

ENGINEERING KNOWLEDGE

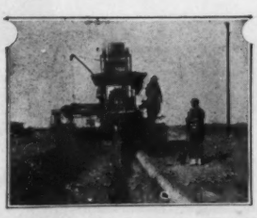
Backed by Practical Experience

Sound engineering principles are necessary in the planning and construction of oil and gas pipe lines.

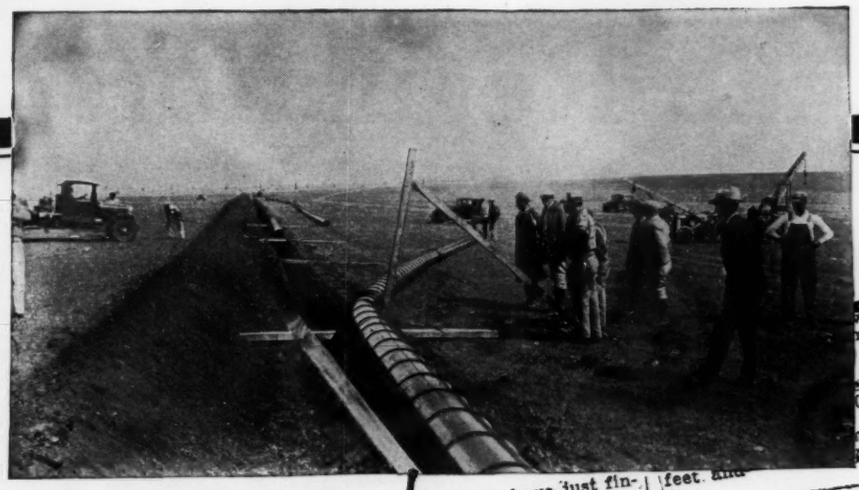
When this knowledge is backed up by men of experience and a past record of high performance a good line within the specified time is assured.

OKLAHOMA CONTRACTING CO.

DALLAS



TULSA



3 Reasons Why

more and more companies are choosing Naylor Pipe for their pipe line service:

1. STRENGTH: Made with an electric welded spiral lock-seam which provides a truss of great strength.
2. LIGHT WEIGHT: Weighs only half as much as standard weight wrought pipe yet carries the same working pressures. Light weight also means lower handling costs and speedier line laying.
3. PERMANENCY: Made of Toncan Iron to resist rust and corrosion.

Consider these advantages and use Naylor Pipe on your next line.

NAYLOR PIPE COMPANY

Main Office and Plant, 1230 East 92nd Street, Chicago

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LOS ANGELES — SAN FRANCISCO

Exclusive Distributors:
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UNIQUE TEST MADE ON LINE PIPE

Forcibly Bent 24 Feet From Ditch—Pipe Remains Undamaged.

ROXANA, TEX.—One of the most severe tests to which line pipe can be subjected was made on two 40 foot joints of a section being laid here today.

The object was to see if the pipe could be sharply bent around a stake without breaking.

On the left side of the ditch, a tractor was pulling against the pipe. On the right side, two more tractors were in action pulling the pipe in the opposite direction—one tractor pulling, the other holding down.

While interested spectators watched, the two 40 foot joints, under the tremendous force, gradually were bent at an angle of 17½ degrees—and to a distance of 24 feet from the ditch before finally kinking. No damage whatsoever was done to the pipe.

The kinked joint was then taken out and replaced by a new joint. The same test was then repeated with the same results.

This pipe, so uniquely tested, was Naylor Spiralweld Toncan Iron Pipe—a product of the Naylor Pipe Company Chicago, Illinois.

TONCAN Naylor Pipe

Mo-lyb-den-um IRON

Standardized Naylor Pipe is made in sizes 6" to 12" I. D. and 14" to 20" O. D. in any uniform length desired up to 40' 0". Ends made to wrought pipe standards for all types of coupling.

Where corrosion resistance is not a factor, Naylor Pipe can be furnished in steel.

Toncan Copper Molybdenum Iron is a development of Central Alloy Steel Corporation, the world's largest and most highly specialized alloy steel producers. It possesses a superior corrosion resistance, making it the favored pipe material.

Reliance Regulators

House Type
High Pressure Balanced Valve
Low Pressure Balanced Valve
High Pressure Compounding
Propane, Butane or Bottled Gas

The Reliance Line now includes a regulator for every purpose in sizes up to six inches, all embodying their patented toggle joint action. Fifteen years experience has proven conclusively that for positive lockup, sensitive and close regulation, great capacity and low cost of upkeep, this device has no equal.

Our new plant, made necessary by the constantly increasing demands for the Reliance, enables us to give most prompt and efficient service.

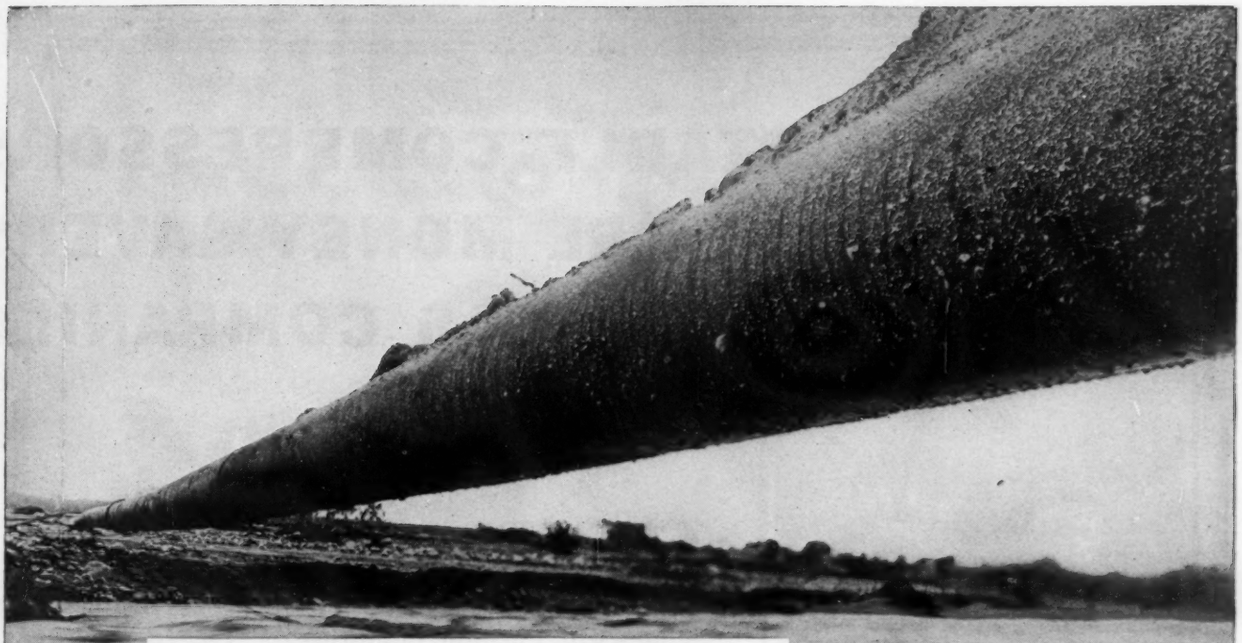
The Reliance Manufacturing Co.

Alhambra, Calif.

Eastern Representative
ISBELL-PORTER CO.,
Newark, N. J.

Northwest
NORTHWEST GAS & ELECTRIC EQUIP. CO.
Portland, Oregon

Mid-Continent
WESTCOTT & GREIS
Tulsa, Okla.
Dallas, Texas



How's this for durable Line Pipe

The raging flood left this temporary tubular bridge unsupported from shore to shore.

The flood waters of a great storm rapidly eroded the channel of this stream and left this NATIONAL Pipe Line, originally laid 4 feet below the bottom, exposed to the full force of the raging current, floating débris and timbers.

One can easily realize the strength and durability of the pipe to withstand the terrific strain which the line had to bear. Here is another unquestionable proof of the dependability of NATIONAL for Manufactured and Natural Gas Service.

America's Standard Wrought Pipe

NATIONAL TUBE COMPANY · Pittsburgh, Pa.

Subsidiary of United States Steel Corporation

"NATIONAL"

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COMPARISON of Hand Methods vs. Machine Methods (as gone into thoroughly in our new Seventh Edition of "100 and 1 Ways to Save Money with Portable Compressors") leaves no question as to the remarkable savings effected by pneumatic equipment in gas industry construction work.

Ingersoll-Rand Portable Compressors, Paving Breakers, Rock Drills, Backfill Tampers, Pneumatic Diggers, Close-Quarter Drills and Calking Hammers are ideally suited for tearing up concrete and asphalt pavements, sidewalks; for drilling prior to blasting, breaking masonry to enlarge manholes, backfill tamping, calking pipe, cutting cast-iron pipe and pipe tapping.

The 120-page book to the left gives the complete story. Where shall we send your copy?

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Volume V **October, 1929** **No. 10**

Official Publication: The Pacific Coast Gas Association; Southern California Meter Association

Western Gas is published by Western Business Papers, Inc. at 124 West Fourth Street, Los Angeles, California. Subscription price (in advance) 20 cents the copy; $2.00 per year; 3 years $5.00; $3.00 per year foreign. Entered as second-class matter June 1, 1925, at the postoffice at Los Angeles, California under the Act of March 3, 1879.

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FRANK H. BIVENS, VICE-PRESIDENT IN CHARGE OF PUBLIC RELATIONS AND SALES, SOUTHERN COUNTIES GAS COMPANY, LOS ANGELES—PACIFIC COAST GAS ASSOCIATION PRESIDENT-ELECT

WESTERN GAS

"Reg. U. S. Pat. Off."

A Monthly Journal of the Gas, Gas Appliance and Natural Gasoline Industries in *Western America*

SAN FRANCISCO LOS ANGELES DALLAS

36th Convention Sums *up* Year *of* Progress *on* Pacific Coast

By GEORGE H. FINLEY
Managing Editor, WESTERN GAS

MARKING the formal close of a constructive year of organization work, highlights of which have been the inauguration of cooperative advertising on the West Coast, and extension of natural gas service to important areas in western territory, members of the Pacific Coast Gas Association came together at Del Monte, California in September for their 36th annual convention. Convention registration opened Tuesday morning, September 10, and from then on to the evening of Friday, September 13, when the annual banquet officially closed the convention, the program of general and sectional sessions, luncheons, playlets, water sports, golf, and sight-seeing on the historic Monterey Peninsula, filled the time of delegates to the full. Headquarters for the convention were made at Hotel Del Monte, all convention events centering in the ideal setting afforded by this famous hostelry. Registration totalled 381 and represented 6 states as well as Canada and Hawaii.

New Leaders

As a result of convention elections, Association leadership for the year 1929-30 will rest in the hands of the following:

President: F. H. Bivens, Southern Counties Gas Company, Los Angeles.

Vice-President: R. E. Fisher, Pacific Gas and Electric Company, San Francisco.

Treasurer: D. G. Martin, Pacific Gas and Electric Company, San Francisco.

Managing Director: Clifford Johnstone.

Directors: Geo. A. Campbell, Sierra Pacific Power Company, Reno, Nevada; J. P. Coghlan, Pacific Gas and Electric Company, San Francisco; C. H. Dickey, Del Monte; John Keillor, British Columbia Electric Power and Gas Co., Vancouver; H. L. Masser, Los Angeles Gas and Electric Corporation, Los Angeles; Wm. Moeller, Jr., Southern California Gas Company, Los Angeles; M. A. Pooler, Tucson Gas, Electric Light & Power Co., Tucson; W. F. Raber, San Diego Consolidated Gas and Electric Co., San Diego; W. M. Thompson, Reliance Manufacturing Company, Alhambra, Calif.

The following appointments have been made for Section executives:

Accounting Section: D. G. Martin, Pacific Gas and Electric Company, San Francisco, *Chairman;* M. W. Thernes, Spokane Gas and Fuel Company, Spokane, *vice-chairman;* R. A. Hornby, Southern California Gas Company, Los Angeles, *vice-chairman.*

Commercial Section: J. Earl Jones, Portland Gas and Coke Company, Portland, *chairman;* F. U. Naylor, Pacific Gas and Electric Company, San Francisco, *vice-chairman;* Frank Weiss, Los Angeles Gas and Electric Corporation, Los Angeles, *vice-chairman.*

Public Relations Section: Geo. L. Myers, Portland Gas and Coke Company, Portland, *chairman;* J. F. Pollard, Pacific Gas and Electric Company, San Francisco, *vice-chairman*; J. C. Gilbert, Southern Counties Gas Company, Santa Monica, *vice-chairman.*

Technical Section: Wm. Moeller, Jr., Southern California Gas Company, Los Angeles, *chairman;* J. E. Kelley, Pacific Gas and Electric Company, San Francisco, *vice-chairman;* R. R. Ripley, Portland Gas and Coke Company, Portland, *vice-chairman.*

By action of the Board of Directors the title of Clifford Johnstone was changed from Executive Secretary to Managing Director.

Section programs are already outlined for the year and on other pages of this issue announcement is made of committee appointments and projects, and personnel of Section executive committees.

Hotel Huntington, Pasadena, California, has been designated as site of the 1930 convention, which will take place the second week of September of next year. Oscar Moore of the Los Angeles Gas and Electric Corporation has been selected as general chairman of the convention committee; Dan L. Scott of the same company will serve as program chairman.

In November the Association will hold a meeting in San Francisco, and another in Seattle, Wash., the middle of June, 1930, these meetings serving to further committee work and extend benefits of Association contact.

Convention Awards

The high order of committee service performed by P. C. G. A. workers during the last fiscal year was apparent from

Delegates to the 36th Annual Convention of the Pacific Coast Gas Association photo-

the numerous awards given meritorious reports at the convention. H. L. Masser of the Los Angeles Gas and Electric Corporation as chairman of the awards committee conferred the following honors at the annual banquet:

Four gold medal awards: One to F. S. Wade, president of the Southern Counties Gas Company, whose chairmanship of the ways and means committee on cooperative advertising was so noteworthy a contribution to the successful launching of this program; to R. A. Hornby of the Southern California Gas Company, chairman of the Accounting Section committee on Fixed Capital; to A. T. Kelly, Pacific Gas and Electric Company, chairman of the Accounting Section committee on Preservation and Destruction of Records; to George L. Myers, Portland Gas and Coke Company, chairman of the Public Relations Section committee on Legislation and Taxation.

Eleven committee reports and one paper were deemed worthy of honorable mention, as follows:

Committee on Sales Department Budgeting, Commercial Section; C. R. Miller, Portland Gas and Coke Company, Chairman.

Committee on Cooperative Advertising, Commercial Section; D. L. Scott, Los Angeles Gas and Electric Corporation, Chairman.

Committee on Natural Gas Transmission Pipe Lines, Technical Section; M. R. Thompson, Southern Counties Gas Company, Chairman.

Committee on Gas Generator Refractories, Technical Section; T. N. Kellett, Los Angeles Gas and Electric Corporation, Chairman.

Committee on Materials and Methods, Technical Section; W. A. Bahr, Pacific Gas and Electric Company, Chairman.

Committee on Adapting Appliances to a Change in Heating Value, Technical Section; A. R. Bailey, Los Angeles Gas and Electric Corporation, Chairman.

Committee on Measurement of Large Gas Volumes, Technical Section; F. A. Hough, Southern Counties Gas Company, Chairman.

Committee on Chemical Control, Technical Section; Duncan Stewart, Pacific Gas and Electric Company, Chairman.

Committee on Oil Gas Production, Technical Section; R. R. Ripley, Portland Gas and Coke Company, Chairman.

Committee on Organic Sulphur, Technical Section; K. N. Cundall, Pacific Gas and Electric Company, Chairman.

Paper: Service is the Key to Better Public Relations, W. M. Henderson, Los Angeles Gas and Electric Corporation.

Paper: Recent Developments in Oil Gas Production, L. B. Jones, Consulting Gas Engineer.

Each year the Basford Trophy is awarded to the Section which is judged to have contributed work of outstanding value. Won last year by the Commercial Section, the trophy for the year 1929 went to the Public Relations Section, A. E. Holloway, San Diego Consolidated Gas and Electric Company, chairman, in whose keeping the plaque will remain for the year. This is understood to be the first occasion that the Public Relations Section has received the Basford award.

Optimism Was the Keynote

The unmistakable tone of optimism which characterized proceedings at the 36th annual convention traced no small part of its origin to the splendidly conceived campaign of cooperative advertising by radio and the trade press, which the Association is now conducting. In the board of directors' report, in convention resolutions, and in member company executive opinion as summed up in the address of A. B. Macbeth at the Wednesday morning general session, a continuation of this campaign beyond the six-month period at present outlined was insistently demanded. A broadcast of one of the weekly talks now going over the National Broadcasting Company's Pacific Coast network was received at the Wednesday morning general session. Keith Clevenger, director publicity and advertising for the American Gas Association, in his address at this session also stressed the multifold advantages inherent in well planned cooperative advertising.

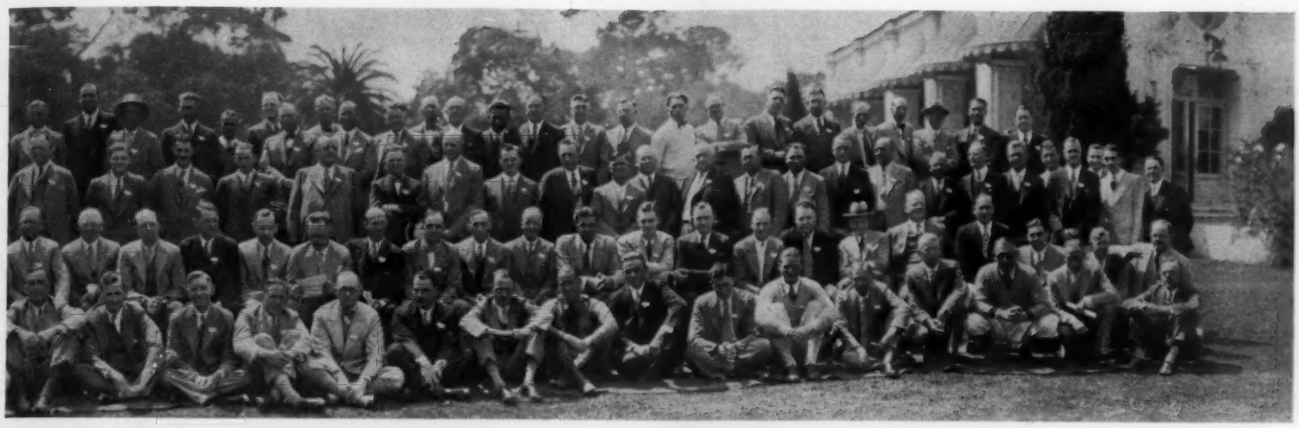
From outside the gas industry came several stimulating speakers to P. C. G. A. general sessions—Elliott Hensel, director of advertising, Los Angeles Illustrated Daily News, with his address, "Telling the Truth Attractively"; Dr. Paul Cadman, Lieb-Keystone & Company, who told "What the Public Think of Gas Company Securities"; and Frank H. Beckmann, president of Beckmann Hollister & Company, Inc., business engineers. Another general session headliner was James L. Stone of the Spokane Gas & Fuel Company, who urged the Pacific Coast industry to "Make Gas Fashionable."

Reporting on behalf of the board of directors at the opening general sessions Tuesday afternoon, F. H. Bivens, then vice-president and now president-elect of the Association, indicated several directions in which future Association energy will be expended. He pointed to the taking of gas company statistics through a separate questionnaire to be circulated by the P. C. G. A.; to the securing of market statistics throughout Association territory by local companies; also to a continuation of the Association's efforts to secure cooperation of appliance manufacturers and distributors in compiling appliance sales totals, as important avenues for continued effort.

Mr. Bivens also announced that the sum of $5,000.00 has been turned over to the Technical Section by the California Gas Research Council to apply on the Gas Engineers Handbook, publication of which is hoped to be complete by the next annual convention.

Resolutions

In addition to calling for continued statistical work directed at producing figures on use of gas and sale of appliances and equipment for its utilization through cooperation of gas companies and manufacturers, and stressing the need for projecting the cooperative ad-



graphed against a scenic background formed by the grounds of Hotel Del Monte.

vertising endeavor over a period of at least three years, convention resolutions also covered the following:

The Association's sincere appreciation was extended to retiring president Charles H. Dickey and to officers, section chairmen and committeemen for their conspicuous service at the head of P. C. G. A. affairs during the past year.

An exceedingly important expression of gas company opinion on the West Coast was carried in the convention resolution concerning the Federal Trade Commission investigation of public utility publicity practices and relations with education institutions. The resolution pointed out that this investigation, now nearing its conclusion, has had reference merely to one side of the subject of government ownership of public utilities and that it is obviously unfair and unjust to privately owned utility interests to make their practices the object of investigation and leave untouched the practices and activities of organizations favoring government ownership and interested in the promotion of opinion and thought favorable to this theory of government. The resolution covering this matter petitioned Senators and Representatives in Congress from states within the Association's geographic division to increase the scope of the pending investigation so as to bring due scrutiny to bear upon government ownership activities in the fields involved.

Another resolution extended to Addison B. Day, president of the Los Angeles Gas and Electric Corporation, the appreciation of the Association for his generosity in establishing the Addison B. Day Medal for Valour, and adopting this medal as a permanent Association institution by which meritorious and heroic deeds of those engaged in the West Coast gas industry may be fittingly recognized.

A convention resolution, its passage signified by the rising of those present, registered the Association's tribute to the memory of John D. Kuster, president of the P. C. G. A. during the years 1918-1919, who died at his home in San Jose, Thursday, September 12, during convention session.

In Memoriam

Six other members passed from P. C. G. A. ranks since the 35th convention, and to them the Del Monte delegates also paid reverence *in Memoriam*. They included:

Wm. Baurhyte—Ex-President Los Angeles Gas and Electric Corporation—Died July 4, 1929.

C. F. Hollingshead—Meter Tester and Assistant Foreman, San Diego Consolidated Gas and Electric Company—Died January 17, 1929.

Wm. G. Kerckhoff—Vice-President Southern California Gas Company—Died February 22, 1929.

J. W. Morton—Assistant Manager Crane Company, San Francisco Branch, Died September 9, 1929.

C. L. Murphy—Manager South Coast Gas Company—Died Noyember 7, 1928.

F. C. Piatt—Assistant Executive Engineer, Pacific Gas and Electric Company—Died November 20, 1928.

Arrangements

Space limitations forbid mentioning the many individuals who bore a part in convention arrangements, making of the four-day session the smooth-running occasion that it was, but specific mention is due the following:

W. D. Dickey, manager of Pacific Meter Works—efficient general chairman of the convention committee. Entertainment was in the hands of a committee composed of R. G. Barnett, chairman, Coast Counties Gas and Electric Company; H. G. Day, Pacific Meter Works; A. R. Bailey, Los Angeles Gas and Electric Corporation; E. W. Florence, Pacific Gas and Electric Company; and A. F. Rice, H. R. Basford Company.

Golf: N. R. McKee of the Southern Counties Gas Company headed the golf committee, assisted by M. W. Gahan, Coast Counties Gas and Electric Company; John F. Heil, Reading Iron Company, and A. C. Hacker, Grinnell Company of the Pacific.

Other convention arrangement functions were capably discharged by the following:

Registration: P. S. George, Pacific Gas and Electric Company.

Property Manager: Wm. J. Crabbe, Pacific Gas and Electric Company.

Editor of "Balloon Juice": Elliott Taylor, *Western Gas*.

Banquet Arrangements: J. S. C. Ross, Pacific Gas and Electric Company.

Transportation: E. C. Wood, Pacific Gas and Electric Company.

Publicity: J. Charles Jordan, Pacific Gas and Electric Company.

Hotel: K. C. Tomlinson, Pacific Meter Works.

Luncheons: J. F. Pollard, Pacific Gas and Electric Company.

Hostess: Mrs. Charles H. Dickey.

"Balloon Juice"

One appurtenance essential to every P. C. G. A. Convention is *Balloon Juice*—the near-truthful purveyor of convention facts and humor. This year Elliott Taylor, San Francisco manager of *Western Gas*, sat in the editor's chair and did his job to perfection. Published in previous years as a four-page pamphlet, *Balloon Juice* this year took the form of an enlarged two-page tabloid, containing the last word in cartoons of convention personalities, special "colyumns," and even some of the better advertising released by such generally known West Coast utilities as the "Potluck Gaz & Coke Co.", "B. G. and E." (Owned-Operated-Managed-*Cautiously*), and the "Los Infernos Gas and Electric Corporation." "Must be seen to be appreciated" aptly fits this year's *Balloon Juice*.

Theatricals

Year by year convention histrionics grow better and better. Four companies were represented in the Public Relations Section stunts night playlets which occupied the evening of Thursday. Supporting a precedent begun some years past, the Los Angeles Gas and Electric Corporation won through to first place with its excellent two-act piece—*"Fires of Industry"*—from the authorship of George M. Sadler, carrying the moral that when gas replaces less modern fuels for factory use the curve of profits shows an immediate upward incline.

(Continued on Page 64)

LEFT: Adjusting Salt Lake City's distribution system for natural gas service. Photo taken August 8, 1929, looking north on Main Street. Trenches are being prepared for a 10-inch steel line. ABOVE: A view along the rolling terrain at one point in the route of the Wyoming-to-Salt Lake gas carrier.

"*Natural*" Comes *to* UTAH...*and* Finds Gas Men Ready

By J. D. ROBERTS
Operating Vice President
Utah Gas & Coke Company
Salt Lake City, Utah

WHEN the properties of the Utah Gas & Coke Company and the Ogden Gas Company were acquired by Western Public Service Corporation last winter several problems arose which required solution before the distribution systems could receive natural gas this September.

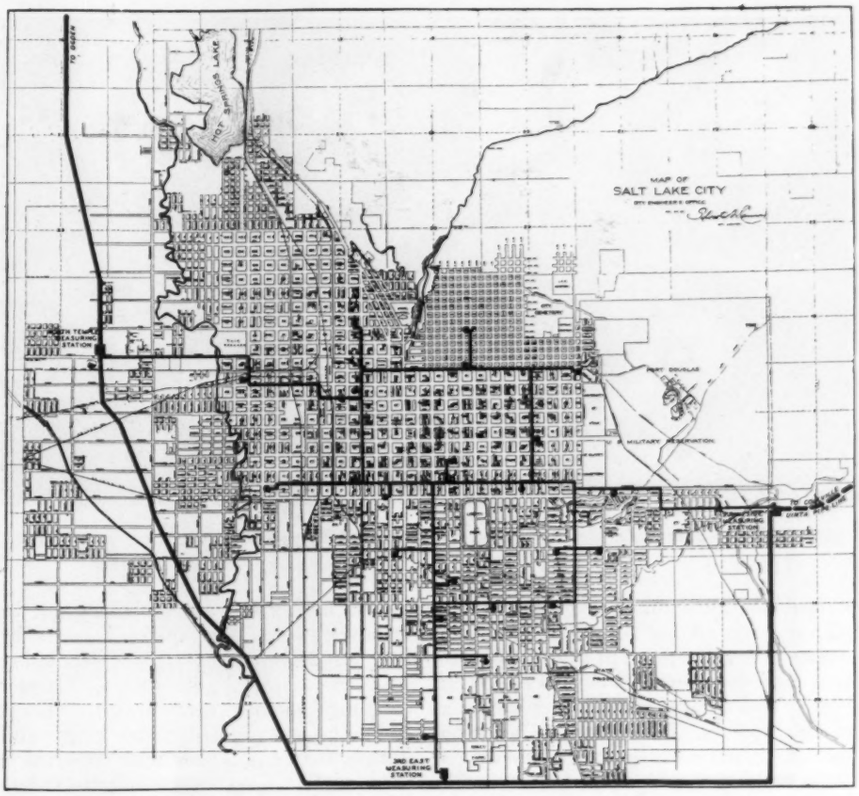
The Utah Gas & Coke Company was serving 18,000 consumers through a system of low pressure mains, composed of steel and cast iron pipe. This pipe was mostly 4-inch, with 3- and 2-inch in the thinly populated sections. Feeders of 6-, 8-, and some small amount of 10-inch, backed up with a 6-pound high pressure line completed the system. It was not thought wise on account of the physical condition of the lines and type of joints to convert this system to an intermediate high pressure system such as is in use in Denver, so that to take care of the enormously increased domestic load due to the expected rapid adoption of gas for house-heating it was decided to lay an entirely new I. H. P. belt line and to install a number of new district regulators. It was further decided to lay a considerable amount of new 6- and 8-inch low pressure mains, 6, to lie in sections which were fed through "bottle necks". A considerable part of the city was not piped at all and a large amount of 4- and 6-inch low pressure mains were outlined for the summer's work.

The terminus of the Uintah Pipe Line is on the bench immediately east of Salt Lake City. It was decided to continue this line around the south and west of the city and thence north to Ogden, a city of 45,000 population lying 40 miles to the north. Taking advantage of this location, which was also necessary to serve Murray, Midvale and Sandy, three towns lying to the south of Salt Lake City, and also Magna, Garfield and Tooele, three more towns to the west of Salt Lake City, three city gate stations were designed—identical in all respects, located on the east, south and west of Salt Lake. Gas is first cleaned by passing it through a 48-inch x 18-inch Acme Gas Cleaner which robs it of all dirt and some of the moisture. It next passes through a pair of gas heaters, which may be operated in cold weather to prevent freezing of the moisture in the gas. It is reduced in pressure through two 8-inch Emco high pressure regulators, measured at a maximum pressure of 100 pounds through three Foxboro wide range orifice meters in 10-inch runs, and is then reduced in pressure to about 25 pounds through a 10-inch Emco regulator.

Three 16-inch steel mains carry the gas from the three city gate stations to the I. H. P. loop, which is made up of 12- and 16-inch pipe so located that gas is equally distributed to all parts of the city. Gas is distributed to the low pressure mains through 21 low-pressure Emco balanced valve regulators. There are three 10-inch, one 8-inch and 17 6-inch regulators. All but two are housed in brick buildings. The other two, due to their location, are housed in under-ground vaults. These regulators are all equipped with the new automatic booster device, which automatically raises the outlet pressure of the regulator as the load increases, lowering it again as the peak is passed.

This construction work was started March 3, and is now complete, with the exception of new low pressure mains which are still being laid in the newer residential districts.

All regulator settings are of the overhead by-pass type, with flanged connections throughout, and welded wherever possible. All are equipped with dead weight safety valves to protect the low pressure system against excess pressure, and all stations are equipped with ven-



AT RIGHT: Major distribution system for natural gas within the limits of Salt Lake City, showing measuring stations and mains from measuring stations to I. H. P. loop. Note course of main line entering Salt Lake system from the east, continuing around south and west of the city, and thence to Ogden, 40 miles north.

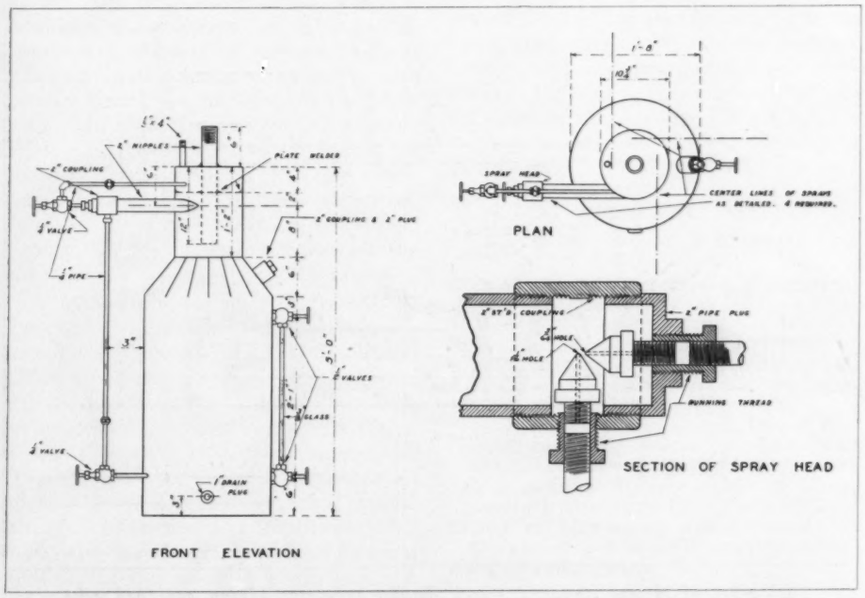
tilators and a double-pen recording gauge giving a 24-hour record of the high and low pressure on the same chart.

The intermediate high pressure system is made of standard weight lap-welded steel pipe, acetylene welded, laid at an average depth of 40 inches. Parkway locations were used wherever possible, to avoid pavement repairs, and for ease of maintenance. Merco-Nordstrom Venturi type plug valves were used to section off this system, so that any part could be replaced or repaired without disturbing the balance of the system. This type of valve was also used in all measuring stations and regulator stations. This type of valve lends itself readily to distribution work on account of its compactness, tightness and ease of operation. As a protection against soil corrosion, one coat of coal tar priming and two coats of coal tar asbestos impregnated paint was applied to the pipe. Where it went under street car crossings it was embedded in concrete composed of sand and cement, as a protection against electrolysis. In addition to this loop, a 10-inch line was laid down Main Street to serve the office buildings in the business district. Numerous 3- and 4-inch laterals from this loop have been laid to reach industrial consumers, our policy being to serve all large consumers wherever possible from the I. H. P. system without imposing a load on the low pressure system.

The old high pressure system was in such a location that it would not fit in with our new I. H. P. loop as an integral part. It was not thought advisable either, to carry 25 pounds on it, from a standpoint of leakage, so after the change-over to natural gas it was converted to low pressure and every low pressure main crossing over it was tied into it, the old H. P. line thus forming a large low pressure feeder which fortunately lay in parts of the city needing just such a line.

Cast iron mains now being laid are made of plain end, horizontally sand cast pipe, two 12-foot sections being bronze welded, these double lengths being joined with Dresser couplings.

A great deal of thought was given to the problem of reducing leakage after natural gas was turned on. It was decided to use both steam and oil vapor to maintain the mains and joints in their same state as when manufactured gas was being served. After the gas passes the last regulator in the city gate stations, sufficient steam is admitted to saturate it with water vapor. A slight amount of oil vapor is already in the gas due to its passing through the Acme Gas Cleaner, which employs gas oil as



Detail of oil fog lubricating device designed for Salt Lake distribution system.

Interior of Sunnyside Measuring Station, Salt Lake City, distributing company end.

a scrubbing medium. In addition to this oil vapor an oil fog is added to the gas stream. A description of this oil fog device may prove interesting. Gas oil is heated and sprayed by gas pressure in a closed chamber, is condensed to a fog by meeting a stream of gas; the heavy particles of oil are scrubbed out centrifugally and the remainder admitted to the line. These are designed following the experiments conducted at Grand Rapids, Michigan. In each regulator station there is also an oil fog device to augment those in the city gate stations. These vaporize the oil by gas pressure only, and are a copy of those used in Grand Rapids. These have a capacity of about three-quarters of a gallon of gas-oil per 24 hours. It is proposed to replace these with the type used in the city gate stations should their capacity prove insufficient.

Later this fall leakage surveys will be made to determine the necessity of leak clamps for the cast-iron and steel mains.

The same procedure was followed at Ogden for preparing the system for natural gas, except that only two city gate stations using 4- and 6-inch regulators and meters were designed, with proportionally smaller sized I. H. P. loop and regulator stations.

It is planned to remove all meters, fill the cases with oil until the diaphragms dip a quarter of an inch and replace them. This will prevent the shrinkage and stiffening of the leather, preventing fast meters in a large measure and postponing the replacement of diaphragms.

ADJUSTING APPLIANCES

When changing from manufactured gas of 400 B. t. u. per cubic foot to natural gas of 1000 B. t. u., there must of necessity be a re-adjustment of all gas burning apliances. Salt Lake City was divided into 11 sections so that consumers in any one section would not be inconvenienced more than 36 hours by lack of adjustment. This sectioning was accomplished by special Dresser couplings of our own design. These couplings had divided center rings with flanges between which were inserted a blind plate. Gaskets were shellacked to these flanges to facilitate the removal of plates, when sections were turned together after the change-over. These couplings were placed in the lines and are intended to remain there permanently so that at any time a leakage test may be run on a section. Bleeders were erected at all dead ends of the sections so that the incoming natural gas could drive out the manufactured gas. These bleeders were made of 2-inch pipe 20 feet long, equipped with screens on the upper ends and stop cocks on the lower ends. A pressure connection and water gauge were provided so that a constant back pressure could be maintained on the mains.

A force of 130 men was recruited and put through a school of appliance adjustment. About 25 men who had been through the change-over at Denver last summer were available, and with our own fitters formed the nucleus of the organization. Each man was taught how to readjust the ordinary appliances commonly found, using principally the Anderson & Forrester adapter, first used in Denver and since then widely adopted. Adjustable spuds could not be screwed back to pass the correct amount of gas without reducing the gas velocity to such a point that sufficient primary air could not be introduced. These tips were accordingly cut off with a hacksaw and the cap reamed out and an adapter inserted.

A survey of gas burning appliances was made only in the business district. A general survey of domestic appliances was not made on account of the widespread use of adapters, thus saving a large sum of money.

On September 20 gas was turned into Section One, and 10 crews of adjusters were started out. These crews were made up of one foreman, two special men and 10 adjusters. Each crew took one block and adjusted all ranges and storage water heaters. Special men adjusted instantaneous heaters, all automatic equipment and all troublesome or obsolete equipment. A warning card was previously mailed to each consumer

(Continued on Page 60)

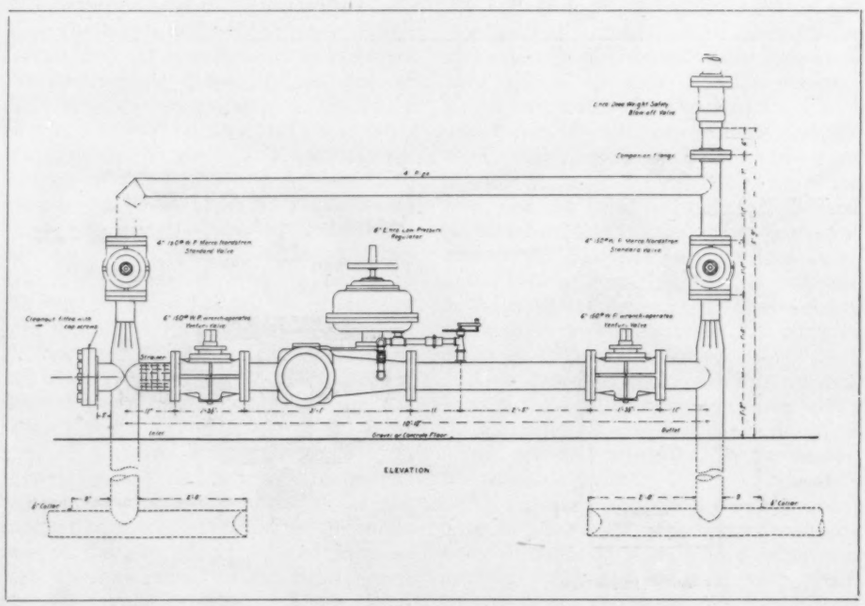


Diagram of typical standard 6-inch district regulator setting equipped with Emco automatic pressure booster.

American Gas Association Issues Eleventh Convention Call

EVERY possible preparation has been made to present a program of unusual merit and wide scope at the 11th Annual Convention of the American Gas Association, in session at Atlantic City from October 14 to 18.

It is anticipated that over 6,000 A. G. A. members and visitors will gather in the auditorium of the Million Dollar Pier for the general and sectional sessions, and will view the manufacturers' exhibits. More space than ever before has been reserved for these, many exhibitors occupying two or more booths. Newly developed products will share with standardized equipment to make this national exhibit fully representative of the gas industry.

General sessions of the convention are in keeping with the high standards established at past A. G. A. meetings. From positions of prominence in national affairs come such speakers as the Hon. James J. Davis, LL. D., Secretary of Labor; Dr. Harvey Nathaniel Davis, president of Stevens Institute of Technology; Miss Laura Cauble, chairman of the National Committee on Sanitation; Hon. Lewis E. Gettle, chairman of the Wisconsin Railroad Commission and past-president of the National Association of Railroad and Utilities Commissioners; and Dr. George Edgar Vincent, president of the Rockefeller Foundation. Speakers on the general sessions program affiliated with the gas industry are: Samuel Insull, Jr., president of the Midland Utilities Investment Company; Walter C. Beckjord, vice-president of the American Light and Traction Company; George E. Whitwell, vice-president of the Equitable Gas Company; and A. W. Robertson, chairman of the board of the Westinghouse Company.

A convention address delivered in England by Sir David Milne-Watson, managing director of the Gas Light and Coke Company of London, England, will be heard by the delegates, through trans-oceanic telephone connection. This is the first time that the trans-oceanic telephone has been used to transmit an address from England during a public utility convention. Amplifiers will make the speech of Sir Milne-Watson audible throughout convention hall.

One important innovation is the shortening of afternoon sessions to provide more time for delegates to view the exhibition. An effort has also been made to eliminate the holding of parallel sessions wherever possible.

The Wednesday evening program will be broadcast over the network of the National Broadcasting Company, and will feature an address by Hon. James J. Davis, LL. D., Secretary of Labor, as well as an interesting musical program and the presentation of life-saving medals and of the Charles A. Munroe Award by Mr. Munroe.

Entertainment features of the convention will include a Gala Night—a fancy dress ball at which prizes will be given—to be held on Thursday evening; a ladies lunch and card party at the Seaview Golf Club; and membership privileges during the entire convention for all delegates at the Seaview Golf Club.

Program for the General Sessions is as follows:

First General Session

Tuesday Morning, October 15
10:00 o'Clock

Opening Remarks by President Oscar H. Fogg, vice-president, Consolidated Gas Co. of New York, N. Y.

"The Association's Finances"—*Clifford E. Paige,* treasurer, A.G.A.; vice-president, The Brooklyn Union Gas Co., Brooklyn, N. Y.

"The Industry's Program"—*Alexander Forward,* managing director, American Gas Association, New York, N. Y.

The President's Address—*Oscar H. Fogg,* president, American Gas Association.

Report of Nominating Committee—*E. H. Rosenquest,* president, Westchester Lighting Co., Mt. Vernon, N. Y.

Election.

"The Engineer of the Twentieth Century"—*Harvey Nathaniel Davis,* Ph.D., S.T.D.

Second General Session

Wednesday Morning, October 16
10:00 o'Clock

Presentation of General Committee Reports:

Accident Prevention Committee—*E. J. Kreh,* chairman; Equitable Gas Co., Pittsburgh, Pa.

Committee on Education of Gas Company Employees—*A. C. Rissberger,* chairman; Rochester Gas and Electric Corp., Rochester, N. Y.

Rate Structure Committee—*L. R. King,* Chairman, United Light and Power Co., Davenport, Iowa.

"The Gas Industry's Social Obligation and Economic Opportunity"—*Miss Laura Cauble,* B.S., A.M., chairman, National Conference on Sanitation.

"Sales Methods Under Strong Competition"—*Geo. E. Whitwell,* vice-president, Equitable Gas Co., Pittsburgh, Pa.

Message from Gas Industry of Great Britain by Trans-Atlantic Telephone—*Sir David Milne-Watson,* managing director, Gas Light and Coke Co., London, England.

"Economics of Load Building"—*Samuel Insull, Jr.,* president, Midland Utilities Investment Co., Chicago, Ill.

Third General Session

Thursday Morning, October 17
10:00 o'Clock

"Where the Industry Stands in Research"—*Walter C. Beckjord,* vice-president and engineer, American Light and Traction Co., Chicago, Ill.

"Regulation by the Sovereign States,"—*Hon. Lewis E. Gettle,* chairman, Wisconsin Railroad Commission.

"Getting and Applying the Facts"—*Dr. George Edgar Vincent,* Ph.D., LL.D., president, The Rockfeller Foundation.

Closing Remarks—*A. W. Robertson,* chairman of the board, Westinghouse Electric and Manufacturing Co., Pittsburgh, Pa.

Among the sectional programs that of the Natural Gas Department is of especial interest:

Natural Gas Department

Tuesday Afternoon, October 15
2:00 o'Clock

Opening Remarks—*S. W. Meals,* chairman of Natural Gas Department, A. G. A.; Carnegie Natural Gas Co., Pittsburgh, Pa.

"Modern Pipe Line Construction Methods"—*Elmer F. Schmidt,* Lone Star Gas Co., Dallas, Texas.

"The Underground Storage of Gas"—*S. W. Meals,* Carnegie Natural Gas Co., Pittsburgh, Pa.

"Natural Gas Rates and Cost Allocations"—*F. C. Hamilton,* Henry L. Doherty & Co., New York, N. Y.

Report of Nominating Committee—*A. W. Leonard,* chairman of the nominating Committee, Devonian Oil Co., Tulsa, Okla.

Refueling *the* GRAF

Natural Gas Powers Last Leg of 'Round

A tail view of the Graf Zeppelin, largest of lighter-than-air craft. The 8-inch fuel pipeline carrying natural gas-propane mixture to the foot of the mooring mast may be seen running beneath the giant air liner.

SUPPLYING motive power for lighter-than-air craft is the gas industry's newest use for its product—a limited use as concerns gas sales, but one which presents many aspects of interest, as a gas application, and one of which much can be made in worthwhile publicity.

Information incorporated in this description of refueling the Graf Zeppelin at Mines Field, southern California, comes from several sources. Lee Holtz, general superintendent of manufacture and distribution for the Southern California Gas Company, who had charge of the natural gas fueling operations, contributes valuable details. J. O. Wiley of Westcott & Greis, Inc., and H. A. Hurley of the Southern California Gas Company, collaborators in a paper on the Graf's refueling, given before the September 26 meeting of the Southern California Meter Association, add many further particulars.—EDITOR.

NO one but a confirmed gas man would see in the growing lighter-than-air craft industry a potential market for domestic gas. For gases which enter into the lifting process—hydrogen — helium — yes, but, asks the layman, where does domestic gas crowd into the picture?

To secure a partial answer to this question it is only necessary to go behind the scenes in the Graf Zeppelin's dramatic world-circling flight, which terminated on August 29 at Lakehurst, New Jersey. The motors which powered the Graf on its epic journey burned a gaseous fuel, and an important constituent of this fuel on the last leg of the tour was natural gas, supplied free of charge by the gas utilities of Southern California. Mixed with this natural gas was a propane product shipped in tank cars by the Carbon & Carbide Chemical Corporation to Mines Field where the dirigible was moored.

Because of the colorful interest which attaches to the Graf's flight, *Western Gas* takes this opportunity to set forth in considerable detail the procedure followed in connection with the refueling, including a description of the metering and mixing installation. A few general facts on the construction and appointments of the Graf will lay a groundwork for a discussion of this newest of natural gas applications.

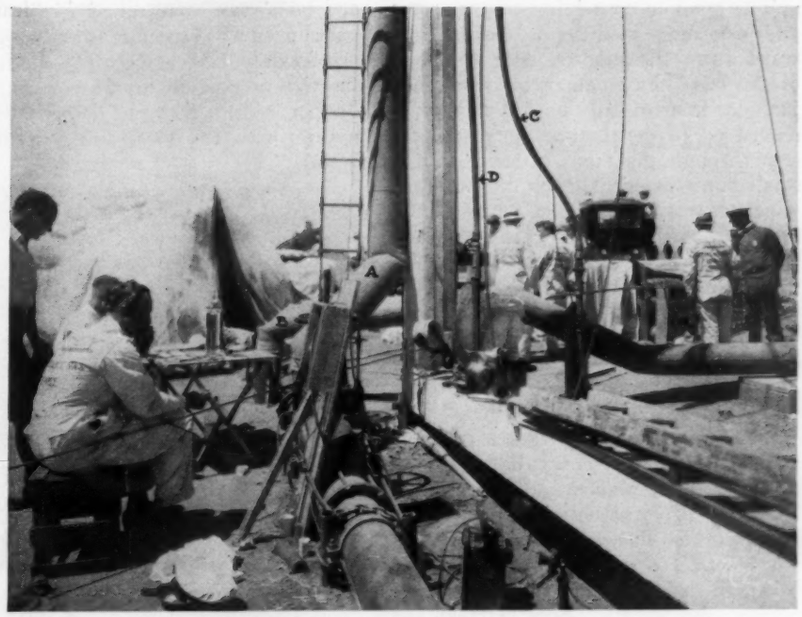
The Graf is the 177th Zeppelin and is the largest airship that has been built to date, though the Goodyear and Zeppelin interests are now constructing two lighter-than-air craft at Akron, Ohio, which are to be considerably larger. Dimensions of the Graf are: Length, 771 feet; maximum diameter, 100 feet.

The fundamental idea as to the design may be briefly summarized as follows: Polygons or so-called rings consisting of light-metallattice girders stiffened with radial wires, were united by means of girders of a similar style of construction, running in the longitudinal direction of the airship to form one complete skeleton in streamline shape. These rings, of which there were 16 in all, are built up at intervals of 49 feet, 3 inches, and limit the boundaries of

Forward end of Graf, showing main gondola, also progress of fueling operations. Pipeline "A" is carrying natural gas-propane mixture for motor fuel. Line "B" carries hydrogen for lifting. Both pipes are flexible.

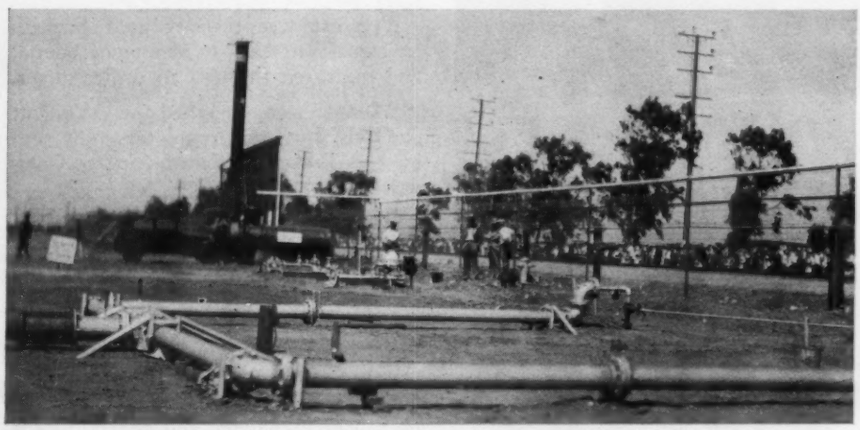
Zeppelin

Largest Dirigible on -the-World Flight



Control station at foot of mooring mast where pressures and gravities were taken. "A" shows natural gas-propane mixture fuel pipe, "B" hydrogen pipe, "C" gasoline, and "D" water. All four fluids were fed into storage compartments of the ship simultaneously.

the individual compartments into which the "gas bags" or ballonnetts for the lifting gas and fuel gas are built. The entire 30-ton duralumin frame work, including the tail, rudder and elevators at the stern, is covered with a cotton envelope woven expressly for this purpose, specially prepared and extremely strong, varnished with several coats to reduce the air resistance and finally treated with aluminum powder to lessen the heating and radiating influence of the sun.



Mixing orifice meter installation used in connection with Graf Zeppelin refueling. Boiler, operating on natural gas, and suppying steam to a heat exchanger, is seen in the background.

MOTOR EQUIPMENT

The airship is propelled by five Maybach motors of 550 h. p. each. These motors, which give the ship a traveling speed of 73 miles an hour on an average, are fitted in five individual cars, called power cars, or gondolas, hanging on the outside of the ship.

The two forward power gondolas are located approximately one-fourth the way back from the nose of the bag and considerably below the bag's center line. Two other power gondolas are about one-third of the way back, slightly lower on the bag than the two forward motors. The fifth power gondola lies beneath the bag midway between the last two motors and the tail, and located about centrally beneath the bag.

The motors are designed to run from 1000 to 2000 hours without any major repairs. They are reversible directly, and weigh 1200 pounds. Power cars are reached by a collapsible metal ladder running through the side of the ship.

One engineer is assigned to each motor.

The control room is in the forward part of the ship with the Tachometers overhead, Gyrocompass and the two wheels on the starboard side, a man at each wheel, one to guide lateral motion and the other to regulate the altitude. Remote control instruments and the leverless operation remind one of the Jules Verne stories of yesterday. The Flight of Fancy becomes a reality.

Communication from control room to power car is by the same type of machine telegraph system as used on steamships.

GAS AND HYDROGEN BAGS

No accurate information has ever been released relative to the number or capacity of the lifting or fuel gas bags. However, there are about 36 ballonetts for hydrogen, of approximately 3500 M. c. f. capacity at atmospheric pressure, and arranged in about three rows of 12 bags, each bag 49 feet long. The rows are suspended in the upper half of the ship.

The fuel ballonetts are suspended from the lower half of the ship, in the same arrangement as the hydrogen bags, but with only 10 or 12 bags, each of about 900 M. c. f. capacity at atmospheric pressure. Both the upper and lower series of ballonetts are manifolded, each being under control.

This ship has about 5000 U. S. gallon storage capacity for gasoline. At Mines Field they asked for 400 gallons and were given 600 gallons. Some of which had to be dumped to trim ship.

The gondola containing control room and passenger facilities is located forward from the motors, near the nose of the bag. Passenger accommodations include first of all a ladder that is moved up to the ship. The passengers step through the main entrance into a small but convenient lobby, the walls of which are covered with a white textile material, with green stripes. On the left, towards the rear end of the ship, there is the comfortably furnished salon, with four large double windows looking to both sides of the car. The windows are behind a wide parapet obliquely to the outside. The two outer panes of each window may be opened even while traveling, as the current of air produced by traveling glides past the windows in consequence of the streamline style of construction of the entire framework. The walls of the salon are panelled to the lower third of their height in mahogany, adorned with marquetry, and in the upper portion are covered with red silk brocade interwoven with gold threads. Before each window there is a table with four comfortable chairs, and on these tables the meals prepared in the galley are served. The galley is a wonder as regards accommodating a maximum of equipment in a minimum of space. At the rear of the salon, on both sides of a wide corridor, there are the 10 bed-sitting room cabins of the airship. Each cabin has its own window for light and in front of each windowsill a convenient wooden table is fitted. By raising the back of each sofa the cabin is converted into a bedroom. At the rear of the cabins there is a lavatory. Washstands are supplied with hot and cold water.

The quarters for the crew are above the main cabin inside of the bag.

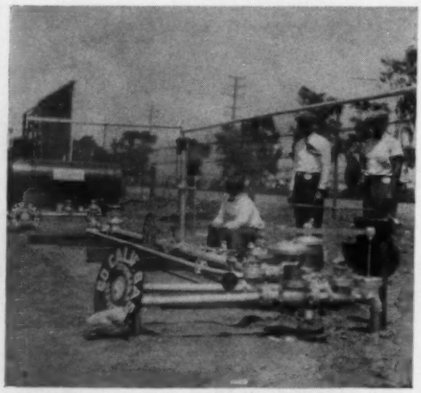
All lighting is by electricity from storage batteries and areo generators. The ship is heated by heat transferred from the motor exhausts.

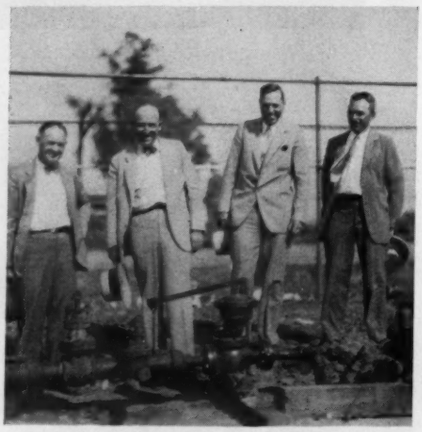
Ballast water is produced very rapidly by using the condensate of the exhaust gases, enabling the ship to dump water so as to rise quickly when necessary.

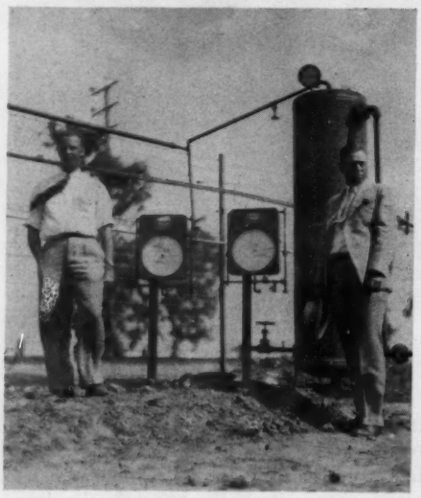
FUELING OPERATIONS

Coming to the fueling of the Graf, the natural gas meter and piping installation was in charge of the Southern California Gas Company, under the supervision of Lee Holtz, general superintendent of manufacture and distribution. Transmission of gas to the metering installation was directed by H. P. George, general superintendent of production and transmission for the same company.

The fuel was a mixture of natural gas (specific gravity of approximately .740) and a "lean natural gas" or propane product (specific gravity of approximately 1.52 at 60° F.) in the respective proportions of 64 per cent and 36 per cent. B. t. u. content of the natural gas was 1100 and that of the propane product, about 2,000 per cubic foot.







UPPER: Natural gas orifice meter installation.

CENTER: Some of the men supervising gas deivery to the Graf, with regulators on natural gas discharge installation shown in foreground. Left to Right: John Murray, Lee Holtz, H. P. George—all of Southern California Gas Company; Walter I. Thrall, Reliance Mfg. Co.

LOWER: Orifice meter gauges and heat exchangers. J. O. Wiley, Westcott & Gries, Inc., at left; H. P. George at right.

Obviously, the chief advantage in employing a gaseous fuel for motive power was its lightness as compared with gasoline, and the additional factor that a specific gravity approximately equal to that of air could be secured in the gaseous fuel, thus making it possible to replace the fuel as used, with air, and not affect the ship's buoyancy. Mixing the natural gas and propane in the above proportions gave an average specific gravity of about 1.04.

FUEL DELIVERY

In the paragraphs below are given details on the piping, metering and regulator equipment necessary in refueling operations.

From an 8-inch main line on a highway between Los Angeles and Redondo, carrying approximately 210 pounds pressure, gas was delivered through two services into the airport at Mines Field. Here a balance valve high pressure regulator was set, reducing the gas pressure to 150 pounds. Gas was then measured through a single 4-inch orifice meter tube, and the pressure brought to 65 pounds through another regulator.

At the discharge of the orifice meter another regulator was set for reducing pressure to a steam boiler.

Pressure was then reduced through an expansion valve to about one pound, and measured through an orifice meter.

Meters were supplied by Westcott & Greis, Inc., and regulator equipment by the Reliance Manufacturing Company.

The propane product was taken from a tank car some 1500 feet from the mixing set-up at about 200 pounds pressure and was delivered through a 2-inch extra heavy pipe, through an expansion valve, where the pressure was reduced to about 1½ pounds. The resultant vapors passed to a heat exchanger and thence to the mixing set-up. This gas was also measured through an orifice meter.

A steam boiler was used to furnish steam at about 10 pounds pressure to the heat exchanger. This was necessary due to the expansion of the propane gas at the expansion valve, and prevented "freezing" from this cause.

At a central point at the discharge of the two mixing meters, where the natural gas and propane united, in the proportion of 64 per cent and rubber coupled line ran some 1280 feet 36 per cent respectively, an 8-inch

(Continued on Page 64)

NATURAL GAS IS NOW AVAILABLE FOR INDUSTRIES
A new fuel....low power costs in the San Francisco Metropolitan Bay area
PACIFIC GAS AND ELECTRIC COMPANY
P·G·&·E·
Here lies a great market... the gateway to the Orient... here is where industries are locating to serve South American Markets.
Natural Gas now available for industries in San Francisco Bay area ....a new and cheaper fuel
PACIFIC GAS AND ELECTRIC COMPANY
P·G·&·E·
INVESTIGATE WHY OTHERS LOCATE HERE
And now.... a supply of NATURAL GAS to the San Francisco Bay area
PACIFIC GAS AND ELECTRIC COMPANY
P·G·&·E·

Reproductions of full-page advertisements for industrial magazines

Over a million readers of national magazines will scan this industrial "copy," which has for its purpose bringing additional industries into P. G. and E. territory.

This Gas Utility Tells *the* Nation

By R. E. FISHER

Vice-President in Charge of Public Relations and Sales, Pacific Gas and Electric Company

IT HAS been remarked that industry is every ready to follow in the wake of low priced and dependable fuel. Even the most casual survey of the big production centers of the United States has shown this to be the case.

The San Francisco metropolitan Bay Area of California, with the lower priced and more efficient natural gas now being introduced, is in a position to merit the serious attention of all the eastern manufacturers who will sooner or later be contemplating the building of plants on the Pacific Coast. We realize, however, that to merely announce to our present consumers that natural gas is here is not enough. To secure the industrial load that this new fuel can rightfully accommodate we cannot limit ourselves to such a course; neither can we hope to achieve the maximum possible send-out by the replacement of solid fuel now in use. In other words, if the Pacific Gas and Electric Company is itself to develop, the territory on which it depends must be developed.

It is with this thought in mind that we have undertaken a broad industrial advertising campaign of national scope, which was initiated in September, and is now appearing in the trade and class publications of the country. To tell the story of San Francisco, industrial center of the West, the strategical central point for distribution activities, and the gateway to the tremendous potentialities of overseas markets, is our objective. In national publications with circulations aggregating over a million a month, full page advertisements carry the message of industrial California and the Pacific Gas and Electric Company.

R. E. Fisher

ORDINARILY, when natural gas enters a community the local gas company is content to aggressively develop the industrial business which is close at hand. Not so the Pacific Gas and Electric Company. With the coming of natural gas to the San Francisco Bay area, the P. G. and E. has enlarged its industrial sales force and inaugurated a thorough-going campaign to increase industrial load—*and* has also undertaken to advertise the advantages of its new fuel to the eastern manufacturing executive.—*Editor.*

The executives of the country's factories are reached through such publications as "Nation's Business," "The Business Week," "Forbes," and "Time." Plant managers, superintendents and production engineers read the same message in "Factory and Industrial Management," "Chemical and Metallurgical Engineering," and "Food Industries."

So that we may judge the effectiveness of this campaign in general and of the individual publications in particular, the advertisements are keyed through a catch line: "Send for a copy of 'Outstanding Features of the P.G. and E.'" Upon receipt of an inquiry a contact is set up with the person inquiring. The name and address is turned over to the divisional sales organization where it will become a prospect for the development of future business.

The booklet, "Outstanding Features of the P.G. and E." tells of the development of the gas and electric business, bringing into play the present construction program both in the gas and electric departments. It also covers the

(Continued on Page 62)

PACIFIC COAST GAS ASSOCIATION

447 Sutter Street, San Francisco, California

A Department Conducted by Clifford Johnstone, Managing Director

Accounting Section Plans for Current Year

THE Accounting Section during the coming year will continue the six standing committees of last year as follows:

Customers' Records Committee.

Classification of Accounts Committee.

Fixed Capital Committee.

General Records Committee.

Purchasing and Storeroom Committee.

Statistics Committee.

Detailed assignments will be made to these committees as soon as the membership of the Executive Committee of the section can be communicated with and suggestions obtained. In general each committee will continue the work already undertaken under the leadership of B. H. Parkinson.

D. G. Martin

It is thought that the General Records Committee will be able to produce this year a standard nomenclature of records, and a standard code to be used as a guide by member companies for the preservation and destruction of these records, which it is hoped will be approved by the regulatory bodies.

The Committee on Classification of Accounts will endeavor to secure the cooperation of the regulatory bodies, and will work on the preparation of a bulletin of accounting rulings along the same lines as the bulletin published by the Interstate Commerce Commission and covering the rulings made from time to time by the various commissions in the states covered by the association. Such a bulletin will be invaluable to accounting departments of member companies.

To the Purchasing and Storeroom Committee will be assigned the study of the advantages and disadvantages of purchasing material locally rather than carrying large stocks.

The Statistical Committee, in addition to assisting the Managing Director's office in the collection and analysis of statistics, will prepare a review of the literature concerning budgetary control.

The officers of the Section are:

Chairman: D. G. Martin, Pacific Gas and Electric Company.

Vice-Chairman: M. W. Thernes, Spokane Gas and Fuel Company.

Vice-Chairman: R. A. Hornby, Southern California Gas Company.

The Executive Committee of the Accounting Section is as follows:

E. H. Adams, British Columbia Electric Power & Gas Co., Vancouver, B.C.
C. A. Hulse, Central Arizona Light & Power Company, Phoenix, Ariz.
Don McCullough, Coast Counties Gas & Electric Company, Santa Cruz.
W. E. Houghton, Los Angeles Gas and Electric Corporation, Los Angeles.
E. W. Hodges, Pacific Gas and Electric Company, San Francisco.
C. W. Platt, Portland Gas and Coke Company, Portland.
M. B. Fowler, San Diego Consolidated Gas & Electric Co., San Diego.
A. B. Carpenter, San Joaquin Light & Power Corporation, Fresno.
A. E. Peat, Southern California Gas Company, Los Angeles.
W. S. McFarland, Southern Counties Gas Company, Los Angeles.
Aloys Knaff, Burroughs Adding Machine Co. Los Angeles.
E. R. Wilcox, Pacific Manifolding Book Co., Emeryville, California.
M. W. Thernes, Spokane Gas & Fuel Company, Spokane, Washington.
R. W. Maxwell, Eastern Oregon Light & Power Co., Baker, Oregon.
Herbert Painter, Tucson Gas, Electric Light & Power Company, Tucson, Arizona.
Wm. B. Addy, Seattle Lighting Company, Seattle, Washington.

Program for Commercial Section—1929-30

IN GENERAL the work now in progress in the Commercial Section will be continued under present committees with slight changes this year. The Commercial Section will work in close co-operation with other Sections on Rate Studies, Co-operative Gas Advertising, and Sales Budgets. Co-operation of the Technical Section on the Architects and Contractors Manual will be invited.

J. Earl Jones

In order to allow more time for the general discussion of topics at the Annual Convention in Pasadena next September, it is proposed to complete as nearly as possible all reports and papers not later than the early summer regional meeting. Following this regional meeting the reports will be circulated among the membership, accompanied by questionnaire forms pertaining to the subject matter, which forms will be returned to the Managing Director's office and used as a basis for discussion at the Annual Convention meeting.

The Commercial Section recommends participation in three Sectional Meetings during the year, namely: San Francisco in November; Los Angeles in February; and Seattle in June.

It is planned to have all outlines of studies completed and detailed assignments made to committee members not later than the San Francisco November meeting. Committee chairmen will be expected to report their progress in this matter in time for the San Francisco meeting and complete certain reports before the Los Angeles February conference and all reports in time for the Seattle June meeting.

It is planned to present special individual papers and studies on topics related to the commercial program at the various regional meetings.

The following subjects have been selected for the 1930 program and committee chairmen assignments made to date:

Architects and Contractors Service Manual: Chairman, Frank Moon, Los Angeles Gas and Electric Corporation.

Domestic Sales Committee: Chairman, L. J. Brundige, Pacific Gas and Electric Company.

Industrial Sales Committee, Manufactured or Mixed Gas: Chairman, Ray Trowbridge, Pacific Gas and Electric Company.

Industrial Sales Committee, Natural Gas: Chairman, Geo. Bowersox, Southern California Gas Company.

Ordinance Committee: Chairman, Clyde Potter, Southern Counties Gas Company.

Advertising Committee: Chairman, D. L. Scott, Los Angeles Gas and Electric Corporation.

Sales Budgets: Chairman, C. R. Miller, Portland Gas & Coke Company.

Gas Refrigeration: Chairman, Geo. W. Smith, Southern Counties Gas Company.

Advisory Rate Committee—Joint committee with other sections.

The following organization for the Commercial Section has been named for this year:

COMMERCIAL SECTION ORGANIZATION FOR YEAR 1929-1930

J. Earl Jones, Chairman, Portland Gas & Coke Co.
Frank Weiss, Vice-Chairman, Los Angeles Gas and Electric Corp.
F. U. Naylor, Vice-Chairman, Pacific Gas and Electric Co., San Francisco.

EXECUTIVE COMMITTEE

H. M. Thomas, Northwest Cities Gas Company, Walla Walla, Wash.

A. Knoernschild, Seattle Lighting Company, Seattle, Wash.
A. A. Salmon, Spokane Gas & Fuel Company, Spokane, Wash.
J. Fremont, British Columbia Elec. Power & Gas Co., Vancouver.
A. F. Morairty, Central Arizona Light & Power Co., Phoenix.
J. B. Wilson, Coast Counties Gas & Elec. Co., Santa Cruz.
Frank Weiss, Los Angeles Gas and Electric Corp.
F. A. Cressey, Jr., Modesto Gas Company, Modesto, Calif.
H. M. Crawford, Pac. Gas and Elec. Co., San Francisco.
John H. Hartog, Portland Gas & Coke Co., Portland.
L. H. Stratford, Public Utilities Cons. Corp., Pocatello, Idaho.
A. E. Holloway, San Diego Con. Gas & Elec. Co., San Diego, Calif.
C. M. Grow, Southern California Gas Co., Los Angeles.
C. H. Fotter, Southern Counties Gas Co., Los Angeles.
O. S. Clifford, Sierra Pacific Power Company, Reno, Nevada.
Walter J. Lane, Turlock Gas Company, Turlock, Calif.
R. W. Coblentz, Washington Gas & Elec. Co., Tacoma, Wash.
C. B. Babbock, C. B. Babcock Co., San Francisco.
W. L. Hoyt, American Radiator Co., San Francisco.
H. R. Basford, H. R. Basford Co., San Francisco.
B. S. Pedersen Geo. M. Clark & Co., San Francisco.
J. J. Lesh, Cahill Company, Los Angeles.
J. P. Davidson, Estate Stove Company, San Francisco.
H. W. Jackson, Jas. Graham Mfg. Co., San Francisco.
C. Roy Ohnimus, Hammer-Bray Company, Oakland.
E. S. Hoyt, Jr., Hoyt-Wood Mfg. Co., Los Angeles.
L. Cinc-Mars, Humphrey Co., San Francisco.
W. W. Norton, Electrogas Furnace Company, San Francisco.
G. W. Anderson, Magic Way Co., National City, Calif.
W. M. Kapus, Northwest Gas & Elec. Equipment Co., Portland.
Robt. J. Merritt, O'Keefe & Merritt Co., Los Angeles.
A. J. Hartfield, Pacific Gas Radiator Co., Los Angeles.
J. H. Knapp, Jas. H. Knapp Co., Los Angeles.
E. L. Payne, Payne Furnace & Supply Co., Beverly Hills, Calif.
Andrew Kerr, Steiger & Kerr Stove & Foundry Co., San Francisco.
J. Brombacher, Superbo Mfg. Co., Vernon, Calif.
R. B. Wheeler, Tappan Stove Company, San Francisco.
Chas. C. Cram, L. R. Teeple Co., Portland.
W. J. Kerr, Ward Heater Co., Los Angeles.
Frank Packer, Welsbach Heater Co., San Francisco.
J. M. Williams, Williams Radiator Co., Los Angeles.
J. E. Moore, A. B. Stove Company, Los Angeles.
J. Graham Hambly, Graham Hambly & Son, Los Angeles.
A. L. Spring, California Servel, Inc., Los Angeles.
J. F. Kathriner, General Sales Corp., San Francisco.
L. B. Mettler, Lee B. Mettler Co., Los Angeles.

Organization of Public Relations Section

Geo. L. Myers

As chairman of the Public Relations Section for the coming Association year, Geo. L. Myers, Portland Gas & Coke Company, announces his section organization as follows:

Vice-Chairmen—J. C. Gilbert, Southern Counties Gas Company; J. F. Pollard, Pacific Gas and Electric Company.

EXECUTIVE COMMITTEE

A. B. Daab, Seattle Lighting Co., Seattle, Wash.
J. L. Stone, Spokane Gas & Fuel Co., Spokane, Wash.
W. C. Hornberger, Arizona Edison Co., Phoenix, Ariz.
James Lightbody, British Columbia Elec. Power & Gas Co., Vancouver, B. C.
Edw. H. Coe, Central Ariz. Light & Power Co., Phoenix, Ariz.
R. G. Barnett, Coast Counties Gas & Elec. Co., Santa Cruz, Calif.
D. L. Scott, L. A. Gas and Elec. Corp., Los Angeles.
F. A. Cressey, Jr., Modesto Gas Company, Modesto, Calif.
Don C. Ray, P. G. and E. Co., San Francisco.
L. H. Stratford, Public Utilities Cons. Corp., Pocatello, Idaho.
Norwood W. Brockett, Puget Sound Power & Light Co., Seattle, Wash.
W. F. Raber, San Diego Cons. Gas & Elec. Co., San Diego, Calif.
A. M. Frost, San Joaquin Light & Power Corp., Fresno, Calif.
F. H. Holden, So. California Gas Co., Los Angeles.
F. H. Bivens, Southern Counties Gas Co., Los Angeles.
Geo. A. Campbell, Sierra Pacific Power Co., Reno, Nev.
A. A. Caldwell, Turlock Gas Company, Turlock, Calif.
C. Y. Bowers, Washington Gas & Elec. Co., Tacoma, Wash.

Technical Section 1929-1930 Leadership

Wm. Moeller, Jr.

Wm. Moeller, Jr., Southern California Gas Company, Los Angeles, and 1929-1930 chairman of the Technical Section, makes the following announcement of vice-chairmanships and main committee chairmanships for the Section:

Vice-Chairmen—

R. R. Ripley, Portland Gas and Coke Company, Portland, Oregon.

J. E. Kelley, Pacific Gas and Electric Company, San Francisco.

Production Committee—

W. A. Bahr, Pacific Gas and Electric Company, Sacramento, chairman.

Distribution Committee—

W. M. Henderson, Los Angeles Gas and Electric Corporation, chairman.

Natural Gas Transportation Committee

A. F. Bridge, Southern Counties Gas Company, chairman.

EXECUTIVE COMMITTEE

W. C. Hornberger, Arizona Edison Co., Phoenix, Ariz.
John Keillor, British Columbia Elec. Power & Gas Co., Ltd., Vancouver.
Roy T. Richards, Central Arizona Light & Power Co., Phoenix.
A. E. Strong, Coast Counties Gas & Electric Co., Santa Cruz.
H. L. Masser, Los Angeles Gas and Elect. Corp., Los Angeles.
J. A. Riggs, Modesto Gas Company.
H. M. Thomas, Northwest Cities Gas Co., Walla Walla, Wash.
W. S. Yard, Pacific Gas and Elect. Co., San Francisco.
E. L. Hall, Portland Gas & Coke Co., Portland.
J. J. Ferrari, Puget Sound Power & Light Co., Bellingham.
L. M. Klauber, San Diego Cons. Gas and Electric Co., San Diego.
W. F. Tyler, San Joaquin Light & Power Corp., Fresno.
Wm. Moeller, Jr., Southern California Gas Co., Los Angeles.
A. F. Bridge Southern Counties Gas Co., Los Angeles.
R. A. Hoffman, Spokane Gas and Fuel Co., Spokane.
Morris G. Lane, Seattle Lighting Company.
Claude Webber, Tucson Gas, Electric Light & Power Co., Tucson.
F. C. Hawks, Washington Gas & Electric Company, Tacoma.
J. W. Reed, Cooper-Bessemer Corp., Los Angeles.
Stanley Kulp, Ingersoll-Rand Co., Los Angeles.
A. P. Bartley, Lattimer-Stevens Co., Columbus, Ohio.
Reese Llewellyn, Consolidated Steel Corporation, Los Angeles.
C. C. Evernham, Merco Nordstrom Valve Co., San Francisco.
C. C. Moore, C. C. Moore & Co., San Francisco.
T. F. Leary, The Mueller Co., San Francisco.
Wm. D. Dickey, Pacific Meter Works, San Francisco.
Dozier Finley, Paraffine Companies, Inc., Emeryville, Calif.
J. H. Hill, Pittsburgh Equitable Meter Co., Los Angeles.
W. M. Thompson, Reliance Mfg. Co., Alhambra, Calif.
E. H. Roeberry, Sprague Meter Co., Los Angeles.
F. S. Bitgood, J. T. Thorpe & Sons, Inc., San Francisco.
R. W. Martindale U. S. Cast Iron Pipe & Foundry Co., San Francisco.
G. H. Unkefer, Westcott & Greis, Inc., Los Angeles.
E. A. McCallum, P. H. & F. M. Roots Co., Connersville, Ind.
Jas. L. Donnelly, Pacific Clay Products, Los Angeles.
C. R. Houghton, Connersville Blower Co., Connersville, Ind.
C. R. Baxter, E. A. Key Co., Inc., Los Angeles.
A. M. Shenk, McEverlast, Inc., Los Angeles.
Chas. C. Hardy, B. F. Sturtevant Co., San Francisco.
E. L. Mathy, Victor Welding Equipment Co., San Francisco.
A. E. De Burn, Pacific Pipe and Supply Co., Los Angeles.
T. S. Curtis, Vitrefrax Corp., Los Angeles.
Walter F. Mulford, Dearborn Chemical Co., San Francisco.
A. B. Burns, Dearborn Chemical Co., Los Angeles.
J. L. Hill, Pacific States Cast Iron Pipe Co., Provo, Utah.
Carlton H. Rose, National Lead Co., of Calif., San Francisco.
B. W. Mueller, B. W. Mueller Co., San Francisco.
Forrest G. Harmon, National Tube Co., San Francisco.
Henry A. Bourne, Jr., A. O. Smith Corp., Los Angeles.
J. T. O'Leary, Chapman Valve Mfg. Co., Los Angeles.

Shoulder to Shoulder

On this and other pages of *Western Gas* will be found the news of the Del Monte Convention and something about plans for the future. Thanks to the many earnest men and women who did more than they were obliged to last year by working on committees of the Association, much real, constructive progress was recorded at Del Monte. With the enthusiasm and momentum which we now have, we will have done much for our industry by the time we meet in Pasadena next September.

There is one task to which we must dedicate ourselves. We must interest gas appliance manufacturers and their representatives in the gas industry. Gas appliance men are interested in getting orders and in making profits. They are interested in competition and expend much energy fighting one another. There are very few, however, who seem interested in the industry which makes their business possible, and fewer still are those who will stand shoulder to shoulder with the gas companies in efforts for mutual benefit. The convention attendance offers evidence of this, and the transcript of discussions offers more and stronger evidence. There are some 30 gas companies on the Pacific Coast. Twenty of them were represented by 189 men. There are over 300 gas appliance manufacturers doing business on the Pacific Coast. Twenty-five of them were represented by 41 men. Of this number only 10 took any important part in the discussions.

It is time that the appliance men awakened to their responsibilities and their opportunities. We are facing a year of intensive load-building effort. The appliance men who help actively and constructively will profit most.

CLIFFORD JOHNSTONE
Managing Director, Pacific Coast Gas Association.

REGISTRATION AT P. C. G. A. DEL MONTE CONVENTION

A

Aronson, Charles S., Pittsburgh Water Heater Co.
Adams, Mr. and Mrs. I. B., P. G. and Elec. Co., Chico, Calif.
Addy, Wm. B., Seattle Lighting Co.
Allender, Mr. and Mrs. S. W., So. Counties Gas Co.
Allen, R. F., P. G. and Elec. Co., San Francisco.

B

Babcock, Mr. and Mrs., C. B., C. B. Babcock Co., San Francisco.
Bahr, W. A., P. G. and Elect. Co., Sacramento.
Bailey, Alan, L. A. Gas and Elect. Corp.
Bailey, P. A., San Diego Cons. G. and E. Co.
Bailey, R. W., So. Calif. Gas Co., Los Angeles.
Banks, F. M., So. Calif. Gas Co., Visalia.
Barker, G. A., Johns-Manville. Inc., San Francisco.
Barnes, B. D., Graham Hambly & Sons, Los Angeles.
Barnes, Dan, Seattle Lighting Co.
Barnes, H. M., San Diego Cons. Gas and Elect. Co.
Barnett, Mr. and Mrs. R. G., Coast Counties Gas and Elect. Co., Santa Cruz.
Bartley, A. F., Lattimer Stevens Co., San Francisco.
Beetham, H. Stanley, Portland Gas & Coke Co.
Biggs, L. L., So. Calif., Gas Co., Glendale.
Bivens, Mr. and Mrs. F. H. So. Counties Gas Co., Los Angeles.
Boezinger, H., Merco Nordstrom Valve Co., San Francisco.
Boose, E., So. Calif., Gas Co., Los Angeles.
Bostwick, Mr. and Mrs. Henry and daughter, P. G. and Elect. Co., San Francisco.
Bourne, Henry A., Jr., A. O. Smith Corp., Los Angeles.
Bridge, A. F., So. Counties Gas Co., Los Angeles.
Britton, Van E., P. G. and Elect. Co., Oakland.
Brundige, L. J., P. G. and Elect. Co., Sacramento.
Buratti, Carl, Johns-Manville, Inc., Los Angeles.
Burns, A. B., Dearborn Chemical Co., Los Angeles.
Bean. H. S., Bureau of Standards. Wash., D. C.
Basford, H. R., H. R. Basford Co., San Francisco.

C

Campbell J. A., J. A. Campbell Co., Long Beach.
Campbell, Mr. and Mrs. Geo. A., Sierra Pacific Pr. Co., Reno.
Campbell, E. G., P. G. and Elect. Co., San Francisco.
Campbell, Mr. D. N., P. G. and Elect. Co., San Francisco.
Campbell, Wm. G., Central Tube Co., Pittsburgh, Pa.
Cavell, R. C., San Diego Cons. Gas and Elect. Co.
Champion, Fred, Southern Counties Gas Co., Los Angles.
Cinq-Mars, Mr. and Mrs. L., Pac. Gas Heating Co., San Francisco.
Christmann, H. R., Estate Stove Co., San Francisco.
Clevenger, Keith, American Gas Ass'n., New York City.
Coghlan, Mr. and Mrs. J. P., P. G. and Elect. Co., San Francisco.
Cohick, W. H., P. G. and Elect. Co., Oakland.
Colburn, Victor, So. Calif. Gas Co., Los Angeles.
Cole Mr. and Mrs. R. E., Portland Gas & Coke Co.
Cox, Mr. and Mrs. E. C., So. Counties Gas Co., Los Angeles.
Colville, Mildred, So. Calif., Gas Co., Los Angeles.
Cookson, W. B., San Francisco, Calif.
Cooper, H M., P. G. and Elect. Co., Auburn.
Corfield, Guy, L. A. Gas and Elect. Corp.
Cota F. M., San Diego Cons. Gas and Elec. Co.
Crabbe, W. J., P. G. and Elect. Co., Monterey.
Crapster, Herbert, Borden Co., L. A.
Crawford, H. M., L. A. Gas and Elect. Co.
Creveling, Mrs. R. E., San Diego Cons. Gas and Elect. Co.
Crooke Arthur, Pittsburgh Equitable Meter Co., Los Angeles.
Chittenden, F. J., Walworth Co., Los Angeles.
Crawford, H. M., P. G. and Elect. Co.

D

Dean, Jack F., Johns-Manville, Inc., San Francisco.
Daily, E. V., Clow Gasteam Heating Co., San Francisco.
Davis, R. C., So. Calif., Gas Co., Los Angeles.
Davis, W. H., Pittsburgh Equitable Meter Co., Kansas City.
Dawe, W. P., So. Calif. Gas Co., Los Angeles.
Day, Mr. and Mrs. Addison B., L. A. Gas and Elect. Co.
Day, Herbert, Pac. Meter Works, Los Angeles.
Davidson, Mr. and Mrs. J. P., Estate Stove Co., San Francisco.
Dazey, K. I., So. Oregon Gas Corp., Medford.
Deburn, Mr. and Mrs. A. E., Pac. Pipe and Supply Co., Los Angeles.
Dickey, W. D., Pac. Meter Works, San Francisco.
Dickey, Chas. H., Pac. Coast Gas Ass'n.
Dickinson, Mr. and Mrs. O. L., P. G. and Elect. Co., Fresno.
Donnelly, James L., Pac. Clay Products, Los Angeles.
Doyle, Mr. and Mrs. Fred, P. G. and Elect. Co., San Francisco.

E

Edwards, H., So. Calif., Gas Co., Los Angeles.
Edwards, Ray A., San Diego Cons. Gas and Elect. Co.
Ehrhardt, Frederick K., So. Calif. Gas Co., Los Angeles.
Elsasser. C. C., Walworth Co., Los Angeles.
Englebright, A. E., P. G. and Elect. Co., San Rafael.
Epperson, E. W., Western Enterprise Engine Co., Los Angeles.
Evernham, C. C., Merco Nordstrom Valve Co., San Francisco.
Egleston, George, H. R., Basford Co., San Francisco.

F

Fagg, J. H., P. G. and Elect. Co., Stockton.
Farmer, D. E., Portland Gas & Coke Co.
Finley, Mr. and Mrs. Dozier, The Paraffine Cos., Inc., San Francisco.
Finley, Geo. H., Western Gas, Los Angeles.
Foulds, H. W., Servel Sales, Inc., New York City.
Fowler, M. B., San Diego Cons. Gas and Elect. Co.
Fulcher, C. N., Pac. Meter Works, San Francisco.
Furlong, H. S., P. G. and Elect. Co., Auburn.
Fuller, R. S., P. G. and Elect. So., San Francisco.
Furniss, Geo. B, P. G. and Elect. Co., Oakland.

G

Gahan, M. W., Coast Counties Gas and Elect. Co., Pittsburg.
Galbraith, L. F., P. G. and Elect. Co., Oakland.
Goldkamp, Otto, San Diego Cons. Gas and Elect. Co.
Graf, Professor, S. H., Orgeon State College, Corvalles.
Graham, Mr. and Mrs. H., So. Calif. Gas Co., Los Angeles.
Gray, A. T., Pac. Pipe and Supply Co., Los Angeles.
Gray, Mr. and Mrs. Henry S., Portland Gas and Coke Co.
Green, Mr. and Mrs. Lester E., L. A. Gas and Elect. Corp.
Greig, W. R., Paraffine, Cos., Inc., San Francisco.
Grosscup, Mrs. Grace, P. G. and Elect. Co., San Francisco.
Grow, O. R. C., So. Counties Gas Co., San Pedro.
Grutzmacher, Mr. and Mrs. R. L., P. G. and Elect. Co., San Francisco.
Gunz, Mr. and Mrs. J. H., P. G. and Elect. Co., San Francisco.
Grunsky, Chas., California Railroad Commission.

H

Hacker, Mr. and Mrs. A. C., Grinnell Co., Los Angeles.
Hagar, Mr. and Mrs. E. B., The Arco Co., San Francisco.
Haines, Mr. and Mrs. Guy, Portland Gas and Coke Co.
Hall, Mr. and Mrs. A. E., Coast Counties Gas & Elect. Co., Santa Cruz.
Hambly, J. G., Graham Hambly & Son, Los Angeles.
Hanmer, Mr. and Mrs. Ernie, George M. Clark & Co., Los Angeles.
Hargreave R. H, P. G. and Elect. Co., San Jose.
Harritt, J. A., San Diego Cons. Gas and Elect. Co.
Hartog, John H., Fortland Gas & Coke Co.
Haun, Mr. and Mrs. Ralph E., So. Calif. Gas Co., Los Angeles.
Hausman, A. R., U. S. C. I. Pipe & Foundry Co., San Francisco.
Hawes, B. F., Pacific Gas Heating Co., San Francisco.
Henderson, E., So. Calif. Gas Co., Los Angeles.
Henderson, W. M., L. A. Gas and Elect. Corp.
Heil, John, Reading Iron Works, San Francisco.
Hennessy, L. L., San Diego Cons. Gas and Elect. Co.
Heryford, H. B., P. G. and Elect. Co., Stockton.
Hill, J. H., Pittsburgh Equitable Meter Co., Los Angeles.
Hill J. L., Pac. States Cast Iron Pipe Co., Provo, Utah.
Hinchey, E. J., Jas. Graham Mfg. Co., San Francisco.
Hoff, Norman, L. A. Gas and Elect. Corp.
Holloway, A. E., San Diego Cons. Gas and Elect Co.
Holtz, Lee, So. Calif. Gas Co., Los Angeles.
Honey, O. A., So. Counties Gas Co., Los Angeles.
Honberger, F., So. Calif., Gas Co., Los Angeles.
Hornby, Robert A., So. Calif. Gas Co., Los Angeles.
Hough, Fred, So. Counties Gas Co., Los Angeles.
Hoyt, W. L., American Radiator Co., San Francisco.
Hubbs, L. A., Servel Sales, Inc., Seattle. Wash.
Hudnut, F. P., General Sales Corporation, Los Angeles.
Hughes, Chas., P. G. and Elect. Co., Red Bluff.
Humphreys, H. P., P. G. and Elect. Co., Marysville.
Hunt, John, P. G. and Elect. Co., San Francisco.
Hinricks, Mildred, P. G. and Elect. Co., Salinas.
Hinde, Mrs. Clarita, L. A. Gas and Elect. Corp.

I

Ingram, Mr. and Mrs. F. C., Southern Calif. Gas Co., Los Angeles.

J

Jahn, H. F., Midwest Piping & Supply Co., Los Angeles.
Jenkins, T. P., P. G. and Elect. Co., Stockton.
Jenkins, Jay, Western Gas, Los Angeles.
Johnstone, Clifford, Pac. Coast Gas Ass'n., San Francisco.
Jones, E. S., Honolulu Gas Co., Honolulu, T. H.
Jones, Mr. and Mrs. L. B., Jones Gas Process Co., San Diego.
Jones, J. Earl, Portland Gas & Coke Co.
Jackman, H. L., P. G. and Elect. Co., Eureka.
Jordan, J. Chas., P. G. and Elect. Co., San Francisco.

K

Kathriner, J. F., General Sales Corp., San Francisco.
Kelly, A. T., P. G. and Elect. Co., San Francisco.
Kapus, W. M., Northwest Gas and Elect. Equip. Co., Portland.
Kellett, T. N., L. A. Gas and Elect. Corp.
Kelley J. E., P. G. and Elect. Co., San Francisco.
Kendall. Guy R., Northwest Gas and Elect. Equip. Co., Los Angeles.
Kerr, L. B., Steiger & Kerr Stove Fdy. Co., San Francisco.
Kinerk, Mary, So. Counties Gas Co., Santa Monica.
Klauber. Mr. and Mrs. L. M., San Diego Cons. Gas and Elect. Co.
Knoernschild, A., Seattle Lighting Co.
Kobler, L. C., San Diego Cons. Gas and Elect. Co.
Krymer, C. T., San Diego Cons. Gas and Elect. Co.
Kennedy, J. E., Plant Rubber and Asbestos Wks., San Francisco.
Kulp, Mr. and Mrs. Stanley, Ingersoll-Rand Co., San Francisco.

L

Lane, John E., Ingersoll-Rand Co., San Francisco.
Lane, W. J., Turlock Gas Co.
Lavigne, Mrs. Florence, Pac. Coast Gas Ass'n.
Lee. Mr. and Mrs. H. A., P. G. and Elect. Co., Red Bluff.
Leary, Thomas, Mueller Co., Los Angeles.
Lewey, Vivian, So. Calif. Gas Co., Los Angeles.
Lindsley, R. L., Hope Engineering Co., Mt. Vernon, Ohio.
Lynch, A. L., So. Calif., Gas Co., Beverly Hills.

M

McKee, Norman R., So. Counties Gas Co., Los Angeles.
Macbeth, Mr. and Mrs. A. B., So. Calif. Gas Co.
Madden, A. E., So. Counties Gas Co., Whittier.
Matheson, E. E., Merco Nordstrom Valve Co., San Francisco.
Marks, W. B., P. G. and Elect. Co, San Francisco.
Marshall, E. M., Madera Gas Co.
Martin, Mr. and Mrs. D. G., P. G and Elect Co., San Francisco.
Martindale, R. W., U. S., C. I. Pipe and Fdy. Co., San Francisco.
Masser, H. L., L. A Gas and Elect. Corp.
Mathey Mr. and Mrs. E. L., Victor Welding Equip. Co., San Francisco.
May, Alfred, San Diego Cons. Gas and Elect. Co.
May, C. C., San Diego Cons. Gas and Elect. Co.
Mayer, H. R., Tappan Stove Co., Los Angeles.
McBurney, Mr. and Mrs. B. F., So. Counies Gas Co, Ventura.
McCann, E. P., Walworth & Co., Los Angeles.
McCarthy, D. J., P. G. and Elect. Co., San Francisco.
McGilchrist, Jean, Portland Gas & Coke Co.
McKay, Geo., P. G. and Elect. Co., San Francisco.
MacLean, A. D., Pittsburgh Equitable Meter Co., Pittsburgh, Pa.
Merrill, E. R., Portland Gas & Coke Co.
Mettler, Mr. and Mrs. L. B., The Lee B. Mettler Co., Los Angeles.
Millar, Maury, Paraffine Cos., Inc., Los Angeles.
Miller, C. R., Portland Gas & Coke Co.
Miller, A. C., P. G. and Elect. Co., San Francisco.
Miller, Gerald E., So. Counties Gas Co., Pomona.
Miller, M. R., So. Counties Gas Co., Long Beach.
Millikan, E. P., George M. Clark & Co. Chicago.
Moeller, Mr. and Mrs. Wm., Jr., So. Calif. Gas Co., Los Angeles.
Moore, J. E., A. B. Stove Co., Los Angeles.
Moore, Geo. A., So. Counties Gas and Elect. Co., Santa Barbara.
Moore, Lewis, Jr., Moore Brothers Co., Joliet. Ill.
Moore, Mr. and Mrs. L. G., So. Counties Gas Co., Santa Ana.
Moore, Mr. and Mrs. O. L., L. A. Gas and Elect. Corp.
Morle, Kenneth, Clow Gasteam Heating Co., San Jose.
Morse, Mr. and Mrs. N. L. and son, So. Calif. Gas Co., Los Angeles.
Mosher, Frank, Bryant Gas Boilers, San Francisco.
Mueller, B. W., B. W. Mueller Co., San Francisco.

Mulford, W. F., Dearborn Chemical Co., San Francisco.
Munro, Ross, Jas. Graham Mfg. Co., Los Angeles.
Murray, Edward, L. A. Gas and Elect. Corp.
Myers, Geo. L., Portland Gas & Coke Co.
Myrick, Miss Marge, San Diego Cons. Gas and Elect. Co.
Myrtle, Mr. and Mrs. F. S., P. G. and Elect. Co., San Francisco
Miller, R. W., Pacific Lighting Corp., San Francisco.

N

Naylor, Forest U., P. G. and Elect. Co., San Francisco.
Neisser, Mr. and Mrs. Otto, Ruud Heater Co., Los Angeles.
Norton, W. Wightman, Electrogas Furnace Co., San Francisco.
Norminton, Mr. and Mrs. F., B. C. Elect. Power and Gas Co., Vancouver.

O

Ohnimus, Mr. and Mrs. Roy, Hammer-Bray Co., Oakland.

P

Packer, Mr. and Mrs. P. C., Welsbach Co., San Francisco.
Painter, Mr. and Mrs. H., Tucson Gas, Elect. Lt. and Pr. Co.
Palmer, H. B., So. Counties Gas Co., Whittier.
Parkinson, B. H., Portland Gas & Coke Co.
Parks, F. T., Public Service Co., Denver.
Pedersen, B. S., George M. Clarke Co., San Francisco.
Perkins, D. H., San Diego Cons. Gas and Elect. Co.
Phillips, R. J., San Diego Cons. Gas and Elect. Co.
Phipps, T. J., The Arco Company, San Francisco.
Platt, Mr. and Mrs. C. W. and son, Portland Gas & Coke Co.
Pool, C. S., Ventura Fuel Co., Ventura.
Potter, Mr. and Mrs. Clyde H., Southern Counties Gas Co., Los Angeles.
Paulsen, N., Coast Counties Gas and Elect. Co., Watsonville.
Pennington, Ann, L. A. Gas and Elect. Corp.

R

Rawlins, James M., Hill-Hubbell Co., San Francisco.
Ray, Don, P. G. and Elect. Co., San Francisco.
Regan, P. J., So. Counties Gas Co., Whittier.
Reed Mr. and Mrs. J. W., Cooper, Bessemer Corp., Los Angeles.
Rice, Al., H. R. Basford Co., San Francisco.
Richards, Mr. and Mrs. H. T., Central Arizona Lt. and Pr. Co., Phoenix.
Ridgway, H. G., P. G. and Elect. Co., San Rafael.
Riggs, Mr. and Mrs. J. A., Modesto Gas Co., Modesto, California.
Rinlev, R. R., Portland Gas & Coke Co.
Robbins, W. E., So. Calif. Gas Co., Los Angeles.
Roberts, Mrs. Jean D., Tucson Gas, Elect. Lt. & Pr. Co.
Rose, C. H., National Lead Co., San Francisco.
Roseberry, Mr. and Mrs. E. H., Sprague Meter Co. Los Angeles.
Rosebaugh, Ted, Shell Oil Co., San Francisco.
Ross, J. S. C., P. G. and Elect. Co., San Jose.
Roths, Mr. and Mrs. M. H., San Francisco.
Rutledge, Mr. and Mrs. C. E., So. Counties Gas Co., Santa Ana.
Roberts, J. T., Stockton Firebrick Co., San Francisco.

S

Sullivan, V. R., Stockton Firebrick Co., San Francisco.
Snell, T. W., P. G. and Elect. Co., Salinas.
Sadler, Mr. and Mrs. Geo. M., L. A. Gas and Elect. Corp.
Sanders, Milton G., Arizona Edison Co., Phoenix, Ariz.
Satterwhite, J. H., Westcott & Greis, Inc., Tulsa, Okla.
Sauer, J. F., P. G. and Elect. Co., Marysville.
Schafer, W. C., P. G. and Elect. Co., Stockton.
Scherer, G. F., Merco Nordstrom Valve Co., San Francisco.
Schiesberg, Mr. and Mrs. George I., So. Counties Gas Co., Santa Monica
Schwartz, S. C., Portland Gas & Coke Co.
Scott, Dan L., L. A. Gas and Elect. Corp.
Shaw, S. B., P. G. and Elect Co., San Francisco.
Smith, R. F., Arizona Edison Co., Douglas.
Simmons, Mr. and Mrs. E. N., L. A. Gas and Elect. Corp.
Smith, R. C., Standard Oil Co., San Francisco.
Spencer, Mr. and Mrs. C. G., So. Counties Gas Co., Pomona.
Spotts, Homer, McEverlast. Inc., Los Angeles.
Spring, A. L., Calif. Servel Co., Los Angeles.
Steiger, Chas. T., Steiger & Kerr, San Francisco.
Stewart, R. M., P. G. and Elect. Co., San Francisco.
Stewart, Duncan, P. G. and Elect. Co., San Jose.
Stone, Jas. L., and daughter, Spokane Gas & Fuel Co.
Stryker, A. P., P. G and Elect. Co., San Francisco.
Suess, W. F., So. California Gas Co., Los Angeles.
Sullivan, Mr. and Mrs. J. T., Sierra Pacific Pr. Co., Reno, Nev.

T

Talcott, Frank, P. G. and Elect. Co., San Francisco.
Taylor, Elliott, Western Gas, San Francisco.
Thomas, A. R., Hope Engineering Co., Los Angeles.
Thompson, Mr. and Mrs. W. M., Reliance Mfg. Co., Alhambra.
Thrall, Mr. and Mrs. Walter, Reliance Mfg. Co., Alhambra.
Tomlinson, K. C., Pac. Meter Works, San Francisco.
Tuttle, J. M., So. Counties Gas Co., Monrovia.

U

Unkefer, Mr. and Mrs. G. H., Westcott & Greis, Inc., Los Angeles.

V

Vaughan, Reginald, U. S., Eng. Corp., San Francisco.

W

Wilson, Mr. and Mrs. J. B., Coast Counties Gas and Elect. Co., Santa Cruz.
Wade, Mr. and Mrs. F. S., So. Counties Gas Co., Los Angeles.
Walker, A. L., P. G. and Elect. Co., San Rafael.
Walters, H. W., Ingersol-Rand Co., Los Angeles.
Webber, Mr. and Mrs. C. H., Tucson Gas, Elect. Lt. & Pr. Co.
Weiss, C. D., San Diego Cons. Gas and Elect. Co.
Weiss, Frank, Los Angeles Gas and Elect Corp.
Wetlaufer, E. H., So. Calif. Gas Co., Los Angeles.
Wheeler, C. O., Steiger & Kerr Co., San Francisco.
White, A. A., P. G. and Elect. Co., Chico.
Wilcox, E. R., Pac. Manifolding Book Co., Emeryville.
Wiley, Geo. W., So. Calif. Gas Co., Visalia.
Wiley, J. O., Westcott & Greis, Inc., Los Angeles.
Wills, Frank, P. G. and Elect. Co., San Francisco.
Williams, J. M., Williams Radiator Co., Los Angeles.
Woodmanse, Mr. and Mrs. C. F., Fittsburg Water Heater Co., San Francisco.
Worthington, W. A., P. G. and Elect. Co., San Francisco.
Wright, Geo., General Sales Corp., Los Angeles.
White, D. T., Jr., Gladding McBean Co., San Francisco.
Wooten, W. M., Standard Oil Co., San Francisco.

Y

Yard, W. S., P. G. and Elect. Co., San Francisco.

Z

Zeigelmeyer, H. L., So. Calif. Gas Co., Los Angeles.

Registration Summary

Following is an analysis of registrations at the Annual Convention:

Gas Company Employees	189
Gas Appliance Representatives	41
Supply Representatives	68
Miscellaneous	9
Affiliation Unknown	3
Ladies	71
TOTAL REGISTRATION	381

Death Overtakes Past Pres. *of* Association

JOHN D. Kuster, San Jose Division Manager of the Pacific Gas & Electric Company and a past-president of the Pacific Coast Gas Association (1918-1919), died at his home in San Jose on Thursday, September 12, after a week's illness from pneumonia. He was 57 years old and is survived by his wife, one daughter, one sister and three brothers. Exactly 20 years ago he came to San Jose as district manager and was later made division manager.

John D. Kuster

Mr. Kuster's death came as the Pacific Coast Gas Association was in annual session at Del Monte. Tribute was paid his memory in a convention resolution, and his death left an impress of sadness upon his many friends and associates in Association work.

I. B. Adams, formerly manager of the De Sabla Division of the Pacific Gas and Electric Company, at Chico, California, has been appointed manager of the San Jose Division to fill the post rendered vacant by Mr. Kuster's death.

STANDARD OIL REPORTED IN DEAL FOR COAST COUNTIES

Persistent newspaper rumors were current late in September ascribing to the Standard Oil Company of California the purchase of the Pacific Public Service Company, holding company for Coast Counties Gas and Electric Company and a number of non-utility enterprises on the West Coast. According to reports, preliminary agreements for the purchase have already been signed. Officials of the Pacific Public Service Company, which is controlled by A. E. Fitkin interests, would make no statement regarding the reported transaction. The Standard Oil's rumored action is interpreted as a step toward insuring market outlets for the company's natural gas production in the Kettleman Hills district of California.

SEVERAL UTAH TOWNS GRANT NATURAL FRANCHISES

Natural gas franchises have been granted to John McFayden and L. B. Denning in the towns of Brigham City, Perry, Box Elder, Willard and Logan, in Utah, and in Preston and Franklin, Idaho.

Upon the granting of these permits, work of surveys and rights-of-way was started. It is expected that the towns will be served from the Baxter Basin-Salt Lake City natural gas line.

GEORGE BOWERSOX OPENS SAN FRANCISCO OFFICE FOR KNAPP

GEORGE BOWERSOX, formerly industrial engineer for the Southern California Gas Company at Los Angeles, tendered his resignation, effective September 23, to become associated with the James H. Knapp Company, Los Angeles industrial furnace manufacturing firm, a subsidiary of the Pacific Lighting Corporation. Mr. Bowersox will open a northern California branch for the James H. Knapp Company, in San Francisco, and will supervise sales from Fresno north. He leaves Los Angeles for San Francisco early in October.

George Bowersox

Western Gas Salesmen's Competition

"Sales Wrinkles" Department Begins in December

WESTERN GAS has a new wrinkle—literally a "wrinkle"—to announce for the attention of sales departments this month. For the past six months we have conducted a regular monthly contest for gas appliance salesmen, devoted to best selling methods for the principal domestic appliances. Eight of these contests will have been staged when the November issue carrics winning manuscripts in the Laundry Dryer event.

Now we offer a slightly different brand of opportunity to the salesman—and to the general gas company employee who has sales ideas of merit. To put it briefly, we are opening a *"Sales Wrinkles"* department which will become a regular feature of *Western Gas* beginning in our December issue.

Open to Everyone

This department will be thrown open to any contributor, no matter what his affiliation with the gas industry may be. All we ask is that sales ideas, briefly described, be submitted to our department. For each acceptable wrinkle $10 will be paid.

The form in which these wrinkles are expressed—whether or not they are framed in "good English"—is of no consequence. It is the idea that we want. In many cases these wrinkles will be brief descriptions of how individual gas companies or appliance dealers have used some one sales promotion device. Less frequently, perhaps, contributors to our wrinkle department will draw upon their original ideas, or will adapt selling innovations which have put across other lines of merchandise, to the use of the gas sales department.

Contributors may submit any number of wrinkles. There is no limit. Payment will be made promptly upon publication of the accepted wrinkles.

Send Your "Wrinkle" Now!

To get this department running within the short period between now and the December issue, it is necessary that wrinkles start coming to us immediately. "First come, first served" will apply here, as our choice for the December selections will naturally be made from among the earliest ideas submitted.

What sales "stunts" have you put over in your own company? What sales wrinkle would aid you if applied in your territory? Send your ideas to the *"Sales Wrinkles"* department of *Western Gas*—now! Each one, if it has sales merit, may mean $10 to you.

Laundry Dryer Contest Ends October 15

HOW TO SELL GAS LAUNDRY DRYERS—this is the subject announced last month for the November contest, closing October 15. And, incidentally, this is the last of eight contests to be conducted by *Western Gas* in its Salesmen's Competition—for in December we begin the *Sales Wrinkles* department, described elsewhere on this page.

Our Laundry Dryer contest is your last chance for a $25 first place in the Salesmen's Competitions . . . or for a $15 second place . . . or a $10 third.

Gas fired laundry drying equipment is the newest, the most efficient for its purpose. *You* have ideas on how best to sell this domestic load builder. Send them to the Contest Editor, air mail—for October 15 is the deadline.

Live Sales Tips Found in Gas Radiator Entries

THIS month the Contest Editor was glad to note several entries in the Gas Radiator competition coming from manufacturers' sales representatives and distributors' salesmen. One contestant in this field came into second prize money, though Justin M. Kennedy, last month's winner, did the improbable and won another first place.

Clifford Johnstone, Contest Judge, submits the following comment upon the Gas Radiator event, and winning manuscripts are published below:

September 20, 1929.

Mr. George Finley,
Western Gas,
124 W. 4th Street,
Los Angeles, Calif.

My dear Mr. Finley:

I am returning to you herewith papers entered in your Salesmen's Gas Radiator Contest, and announce that we have selected prize winners as follows:

First Prize: Justin M. Kennedy, Special Representative, Southern Counties Gas Company, Santa Monica, California.

Second Prize: F. H. Benns, Branch Manager, Clow Gasteam Radiators, Houston, Texas.

Third Prize: Greeley Sargeant, Salesman, Washington Gas & Electric Company, Everett, Wash.

This contest has been notable in that it is the first in which representatives of gas appliance dealers have entered, and I think you should be delighted to have this evidence that *Western Gas* is carefully read by this branch of the industry.

Monthly Prizes: $25 *first*—$15 *second*—$10 *third*

A New Contest Announced Each Month--Read *the* Conditions

Mr. Kennedy, winner of the first prize, is to be congratulated on being a two-time winner, having been awarded first prize last month for his paper on "Central Gas Heating." He wins again this month because of the general excellence of his presentation and the care with which he covers most of the important arguments in favor of individual radiator installations. It is perhaps unfortunate that he confines his arguments to the gas steam type of radiator, but naturally in 300 words it is difficult to cover a great deal of ground.

Mr. Benns wins second prize because of his careful explanation of the relative fields of vented and unvented radiators, and in spite of some ambiguity in expression.

Mr. Sargeant wins third prize because his arguments, while not entirely covering the ground, are well presented and are the strongest arguments which could be used in the territory where he is located, where the competition comes chiefly from coal and wood.

Yours very truly,
CLIFFORD JOHNSTONE.

1st

JUSTIN M. KENNEDY

Southern Counties Gas Company
Santa Monica, California

"NO part of your home equipment contributes as much to the health and comfort of your family, Mr. Prospect, as a correct heating system; and *the modern fuel—gas—quick, clean, sure,* when utilized in a gas-fired radiator of the steam type makes this ideal condition possible.

J. M. Kennedy, Winner Gas Radiator Contest

"Abundant warmth, uniformly distributed— without extremes—and with just the proper moisture maintained, will be assured with this distinctively designed radiator. Automatically controlled, only sufficient gas passes to sustain the proper steam pressure. No thought need be given the radiator after it is lighted and one hundred per cent of the fuel consumed is transformed into healthful heat.

"It will not be necessary to go to the expense of excavating, Mr. Prospect; no basement is required. All circulation problems are eliminated in this particular gas radiator, which is a complete, independent steam heating unit insuring constant heat where, and as you want it. You may have heat in one room or in all the rooms just as you desire. It will supply quick heat to meet the intermittent requirements of early fall as well as provide constant warmth during the winter months.

"The Blue Star Seal, Mr. Prospect, is a guaranty that this approved gas radiator complies with basic national standards of safety, durability and efficiency, assuring dependable operation. It is a symbol of good service.

"This radiator is adaptable to modern architecture and may be decorated to blend with the furnishings of any room, and—this should interest Mrs. Prospect—the installation is very simple and can be made without disturbing walls or interior decorations.

"If convenient I would be glad to call this evening and calculate the exact amount of radiation required to give you a gas heating system combining convenience, cleanliness, economy and permanence. Thank you, Mr. Prospect."

2nd

FRANK H. BENNS

Clow Gasteam Heating Company,
Houston, Texas

"WHEN you think of heating your beautiful home your first thought is safety from fire and for health. Then, what the fuel bill is going to be and what depreciation you will have on your heating system, making it a good or poor investment.

"Gas radiators are built of the best gray cast iron obtainable, making them impervious to wear, with lapped joints between each section making the fire invisible to the eye, also making it safe for children as there is no place that the children can push paper or other articles and catch their clothes on fire. Gas radiators will give you heat on the floor where you live and being a mild heat does not rise to ceiling but penetrates the remote corners. Gas radiators give you steam heat but eliminate the heat losses involved in many other kinds of steam heating. Gas radiators have a flexibility possessed by no other heating system, as in dry climates the unvented radiator with its perfect combustion gives the proper humidity in your home, and in moist climates the vented radiator eliminates the moisture that is left on the windows and sometimes the furniture in using open heaters.

"Gas radiators can be connected with electric switch so they can be lighted from any remote location or can have thermostatic control. They are standard fire and are approved by the American Gas Association.

"*Summary of gas radiators' advantages:* Safety, health, low upkeep, low fuel consumption and, they will last the life of your home."

3rd

GREELEY SARGEANT

Washington Gas & Electric Company,
Everett, Washington

"THERE are many reasons why you should install gas-fired radiators in your home, office or place of business.

"Gas-fired radiators are clean, safe and odorless. They produce a clean, even heat, which, in turn, helps to keep clean the furnishings of your home or office. There are no smoke, dirt and ashes to worry about.

"One advantage in using gas-fired radiators is that you do not need to use any valuable space for a dirty heating plant, or for the storage of fuel. When heating with gas-fired radiators, all the space required is that occupied by the radiators installed.

"Gas-fired radiators, once installed, do not wear out. A gas cock is the only moving part. Permanence is insured, the radiators being made of cast iron.

"Comfort. indeed, is one reason why you should install gas-fired radiators. . Just light the gas, and the heat is regulated automatically. This means, no coaxing of obstinate fires, or having to get up early in a cold home to build fires. When your gas-fired radiators are installed, you will have no more heating drudgery—just good solid comfort.

"Another great advantage of gas-fired radiators is that you do not have to heat the whole building in order to heat a certain portion which is to be used. Take for instance a church. Very seldom do all parts of a church need to be used at the same time. Gas-fired radiators permit heating any portion of the church, according to the needs, at any given time.

"Each gas-fired radiator can be made to heat independently of the others, by means of the thermal control. As a result of being able to heat the radiators independently of each other, this system naturally proves a more economical way of heating. That is, you pay only for the amount of gas that is used.

"Therefore, taking into consideration the many advantages of gas-fired radiators, it would be advisable for you to install them in your home, office, or place of business."

With *the* Metermen

Tests *to* Determine Correction Factors Needed *in* High Pressure Dry Gas Measurement

By W. L. COWAN*

THE following is a report based on the incomplete, unchecked data obtained from tests on metering dry natural gas under high pressures and high differentials made by the Gas Measurement Committees of the Natural Gas Department of the American Gas Association, Pacific Coast Gas Association, members of the California Natural Gasoline Association, with the co-operation of the U. S. Bureau of Standards and under the supervision of H. S. Bean, Physicist and Chief of the Gas Measuring Instruments, Section of the U. S. Bureau of Standards. The tests were made on the dry gas of the Milham Exploration Company's wells at the Buttonwillow gas field, California, (April-May, 1929) in conjunction with Boyle's Law Deviation Tests made on the same gas at Taft, California. This report is clearly an unofficial one, its purpose being to give some idea as to the general trends and results which might be expected when the data and calculations have been completely checked over.

W. L. Cowan

The object of the tests was primarily to determine the Boyle's Law Deviation Factors for temperatures and pressures corresponding to those found in the field and secondly, to apply these deviation factors to the measurements taken in the field under actual gas flow to find if this correction was the only one needed to determine correct volumes or whether there were other factors entering into the measurements or calculations which should be accounted for, such as variations caused by changing gas velocities, viscosity, density, ratios of orifice to line diameters, etc.

As these tests were made upon only one kind of gas, namely, a very dry one testing about 98.5 per cent to 99.0 per cent methane, it must be remembered that the following results can only be applicable to gases of this same nature, for it is assumed that gases containing butane, ethane and other higher hydrocarbons, have a different deviation from Boyle's Law than this gas tested.

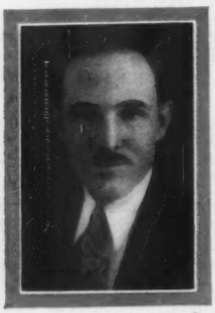
APPARATUS AND EQUIPMENT

The Boyle's Law Deviation apparatus used was one devised by the U. S. Bureau of Standards, which measures the compressibility of a gas by means of displacement by mercury. With this method, gauge pressures on the sample bomb are measured with a dead weight tester, the gas and the oil in the tester being separated by a column of mercury. The pressure of gas in the mercury burrette is measured by a mercury column. The temperature of the gas sample, as well as the mercury used in the tests, is held constant (within a fraction of a degree Fahrenheit) by immersion of the entire apparatus, except of course, the dead weight tester, in a water bath which is gently but thoroughly agitated by air or gas under pressure being bubbled through it. To obtain the lower temperatures, sufficient ice is added from time to time to keep the temperature constant. The gas sample bomb, tubing, etc., must be absolutely free of all for-

*Presented before the Southern California Meter Association, August 22, 1929.

R. F. Angell New Head *of* So. Calif. Meter Ass'n.

FILLING the vacancy made by the resignation of J. J. Delaney, Robert F. Angell was named in September to the presidency of the Southern California Meter Association. Mr. Angell, chief meter inspector of the Los Angeles Refinery of the Union Oil Company, is a charter member of the Association and has contributed much of value to its proceedings. His election by the board of directors took place at the September 4 meeting.



R. F. Angell

B. G. Williams, vice-president of the Association, introduced President-Elect Angell to office at the September 26 general meeting, held at Cole's Cafeteria, Huntington Park.

At this meeting T. K. M. Smith, chairman of the Standards Committee, gave a paper on "Orifice Plates," discussing many types of plates, the care of plates, etc. This was the first of a series of papers to be given under the auspices of the Standards Committee and it developed a lively discussion. Stereopticon slides showing diagrams of orifice plates of various types accompanied the paper.

"Refueling the Graf Zeppelin" was the title of a highly interesting paper read by J. O. Wiley of Westcott & Greis, Inc. A. J. Hurley of the Southern California Gas Company collaborated with Mr. Wiley in the preparation of the paper.

In the absence of Ralph Cook, chairman of the Program Committee, B. M. Laulhere introduced the speakers and directed discussion following the papers.

During the business session at the September 26 meeting 11 new applicants were voted into membership. A number of visitors were introduced, including Professor Sutherland, who briefly told of the gas course which he conducts at the Huntington Park High Schooi.

A. E. DeBurn, winner of the *Western Gas* Good Fellowship Trophy, in the Association's Golf Tournament of September 22, was presented with the cup by the August winner, U. A. Hammett. Ten dollars in cash prizes for second and third places were contributed by Neilan Schumacher Company and went to M. E. Carrico, Southern California Gas Company, and R. G. Bray, Union Oil Company, who tied for these honors.

Two Standards Committee data sheets were issued at the September monthly meeting, one a dimension sheet for standard and heavy flanges and flange fittings, the other a sheet giving check readings for square root charts for Westcott meters.

AT RIGHT:

The Southern California Meter Association *Western Gas* Good Fellowship Trophy — object of monthly golf competition for Association members

Winners of the Good Fellowship Trophy to date are U. A. Hammett and A. E. DeBurn. When 10 more names are added a play-off will be held for permanent possession of cup.

eign substance, such as air, condensate, water vapor, etc., or in other words the sample must be a true sample of the gas being tested. Thorough purging is probably the best method to follow to be sure of the sample.

The time required to operate this apparatus is directly proportional to the initial pressure of the gas the temperature of the test, and also to the relative size of the burrette to the sample bomb, the latter of course being a constant for any one apparatus, the larger the burrette used the shorter the time required to obtain a full set of readings. For a sample under 600 lbs. per sq. in. pressure, it takes about six hours to obtain the full set of data and then possibly an hour or two to compute the results obtained. Familiarity with the apparatus, of course, will bring this time of operation down considerably. For better results, two men are needed in its operation, although one man can do it correctly with somewhat more difficulty. A report on this apparatus will soon be published by H. S. Bean through the U. S. Bureau of Standards.

The instruments, hookup and general equipment used in the field tests are rather clearly shown in Figure 1. The flow of gas coming from the dry gas wells was first regulated by the valves on the well control heads and then the gas passed on through lengths of 2½-in. or 3-in. pipe, which connected to the upper end of 4-in. line containing the orifice to be tested. On the upstream end of this 4-in. pipe, some 100 ft. above the test orifice, a large control valve was installed. To obtain a more sensitive control, a small bypass line about this valve was made, the flow through which was controlled by a valve on the main control board. For convenience, a pressure gauge was connected to the up-stream side of this small line and mounted on the board. This gauge gave the pressure of the gas coming into the line, which was very necessary, as it indicated the gas available at the testing equipment if, of course, the well valves were opened wide.

The flow and pressure of the gas through the test orifice was further regulated by two 4-in. valves in series. These valves also had small bypass lines about them, the flow through which was regulated at the main control board. The gas then passed on through a length of larger pipe after which it split up into two separate streams, flowing through two parallel 10-in. lines. In each of these two 10-in. lines an orifice plate was installed, that is, when the flow was large enough to require an orifice in each line. These two 10-in. lines and orifices acted as the standards by which the flow of the gas in the 4-in. line was corrected. These 10-in. lines were then each reduced to 4-in. lines again and a final 4-in. control valve was istalled in each of them for the final regulation of flow and pressure. The gas, after passing through these valves, was then blown to the air at atmospheric pressure.

The orifice in the 4-in. line being the one tested at various pressures and high flow rates, both line tap and flange tap connections were used while two thermometer wells were placed 12 diameters from the orifice, one being on the up-stream side and one on the down-stream side. Gauge pressures were recorded either by dead weight testers or 50-in. mercury "U" tubes, as conditions of flow warranted, while the differential drops were recorded with 50-in. water "U" tubes or 50-in. mercury "U" tubes and at extremely high drops by means of dead weight testers as shown in Figure 2.

Tests by the U. S. Bureau of Standards had been run on other lines by which the flow through the 10-in. lines could be calculated quite closely, using discharge coefficients previously found for various values of orifice to pipe diameters and various values of differential to initial pressure. On these lines, flange taps only were used and the differentials carried were never over 50 in. of water, while the gauge pressure was never allowed to rise over 50 in. mercury.

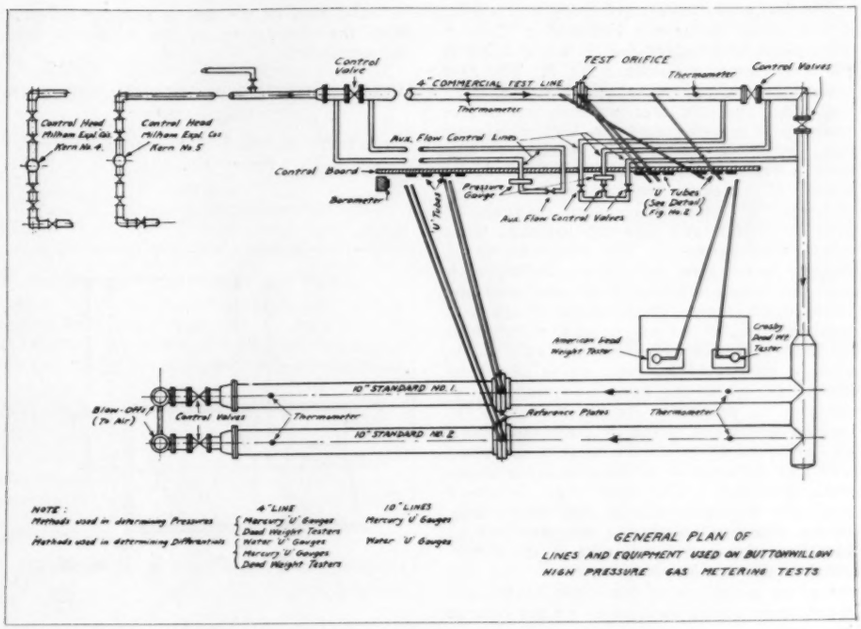


Fig. 1

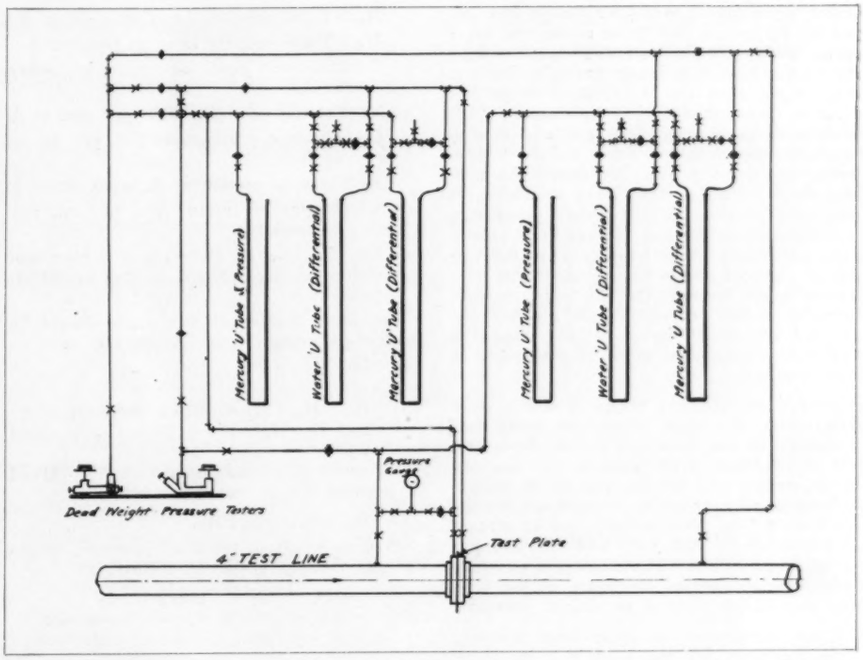


Fig. 2

All line pressures recorded were taken at the up-stream taps for both flange and line connections, which, of course, in the case of flange taps was not standard practice. obtained by subtracting the differential (ex-Down-stream pressures, however, were easily pressed in the same units as the pressure) from the up-stream pressure.

As the gravity of the gas was not needed to obtain comparisons of flow between the 10-in. lines and the 4-in. line measurements. but two sets of gravities were run using an Acme Balance, the average of which is here estimated as .565 (air = 1).

PROCEDURE

Upon the completion of the field apparatus and pipe lines, tests for leaks were made and those found, stopped. The internal diameters of the pipes and orifices had all been measured previously. One complete set of plates was used for each of the standard 10-in. lines. Constants for these plates were then computed and tabulated and curves of the discharge coefficient for each of the 10-in. line plates were plotted for changing values of differential to initial pressure ratio.

The test was then started using first a 4-in. x 1-in. plate in the test line and a 10-in. x 1-in. plate in standard No. 1, while a blank plate was used in standard No. 2. The first series of readings were taken at about 20 lbs. gauge pressure, starting with low differentials and working up to the higher rates of flow, using the same initial pressure. For these lower differentials, read with the 50-in. water "U" tubes, as well as when the 50-in. mercury "U" tubes were used, readings by both the flange and line tap methods were taken simultaneously. The temperatures of the gas were taken three times during each run, the barometer was read once and the atmospheric temperature once. Each run consisted of 10 pressure and differential readings taken at 60-second intervals at the start of the test (and later on at 30-second intervals), while the gas flow remained as constant as possible. As the flow was increased the blank plate in Standard No. 2 was replaced by an orifice to keep the pressure and differential in the standards somewhat constant. The flow was increased gradually through the 4-in. line test orifice, taking readings so that a complete set of data was obtained for ranges of the differential to the initial pressure, from very low values up to values of this ratio (expressed in the same units) as high as 40 per cent in this series.

After this series of runs had been made the initial pressures on the 4-in. line test orifice were raised to approximately 215 lbs. per sq. in. gauge, and these up-stream pressures were recorded on the dead weight testers for both the flange and the line tap connections until the differential drops became so great that the 50-in. mercury "U" tubes were inadequate. After this point was reached only the two dead weight testers were read for the 4-in. line data. As only two dead weight testers were available, it was only possible to take either the flange tap readings or the line tap readings at one time, one tester being hooked up to the up-stream tap and one to the down-stream tap; the difference between the two being the differential in lbs. per sq. in. As the flow increased the plates in the 10-in. standards had to be changed as often as conditions of flow required.

Two other pressure series readings were then taken, the same procedure being followed as in the previous series, these two sets of readings being taken at 420 lbs. per sq. in. gauge, and 620 lbs. per sq. in. gauge, making in all four series of readings for the one 4-in. x 1-in. plate, namely, for up-stream pressures of 20, 220, 420, and 620 lbs. per sq. in. respectively. The maximum pressure drop recorded across the plate in the 4-in. line was 65 per cent of the initial pressure.

Upon completion of these four pressure series readings for the 4 in. x 1 in. plate, the whole procedure was repeated using a 4 in. x 1.9 in. plate in place of the 4 in. x 1 in. When this had been done, the 4 in. x 1.9 in. plate was replaced by a 4 in. x 2.5 in. plate and the same data taken for this plate. However, in the case of the 4 in. x 2.5 in. plate it was not possible to obtain large enough volumes of gas to get the larger differentials.

After all these field tests had been made, tests for the deviation from Boyle's Law (Fig. 4) were made on the gas, which were probably quite accurate, as it is unlikely that the gas changed enough in quality from the start of the test to its completion that the results could be affected appreciably on this account.

To fully understand the results of this test, it is necessary to show the principles upon which the calculations and results are based as the method of deriving the flow formula used in the test is slightly different from the derivation of the formulas used commercially.

DERIVATION OF FLOW THROUGH AN ORIFICE

(Reference—Bureau of Standards Research Paper No. 49)

LIQUIDS
(Incompressible, Non-viscous Fluids)

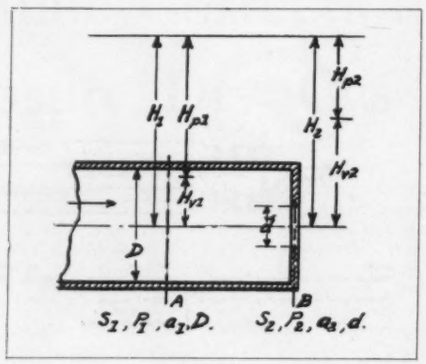


Fig. 3

Let H_1=Total hydraulic head at position A
H_{p1}=Total pressure head at position A
H_{v1}=Total velocity head at position A
D=Diameter pipe (internal) in inches at A
S_1=Velocity of fluid in ft. per sec. at A
P_1=Absolute pressure in lbs. per sq. in at A
A_1=Area of section at A in sq. ft.
u=Density of liquid (lbs. per cu. ft.) =constant

Let H_2, H_{p2}, H_{v2}, S_2, P_2, A_2 and d represent corresponding values to the above at position B.

For ideal theoretical flow there should be no loss of energy from (A) to (B) or

(1) $H_1=H_2$

But

(2) $H_1=H_{p1}+H_{v1}+$(Head of position A) and $H_2=H_{p2}+H_{v2}+$ (Head of position B)

However as (Head of position A)=(Head of position B). If the line is level

(3) $H_{p1}+H_{v1}=H_{p2}+H_{v2}$

Placing heads in terms of pressure, velocity and density, gives the following:

(4) $\dfrac{144P_1}{u}+\dfrac{S_1^2}{2g}=\dfrac{144P_2}{u}+\dfrac{S_2^2}{2g}$ or

(5) $\dfrac{1}{2g}(S_2^2-S_1^2)=\dfrac{144}{u}(P_1-P_2)$ or

letting H = Differential (P_1-P_2), $=\dfrac{144}{u}H$

Considering the total energy for a flow of W lbs. per sec., which must be the same at both section A and Section B

(6) $\dfrac{W\,P_1\times 144}{u}+\dfrac{W\,S_1^2}{2g}=$

$\dfrac{W\,P_2\times 144}{u}+\dfrac{W\,S_2^2}{2g}$ representing,

(Potential energy of pressure plus kinetic energy flow at position A)=(Potential energy of pressure plus kinetic energy flow at position B).

Transposing, gives

(7) $\dfrac{W\times 144}{u}(P_1-P_2)=\dfrac{W}{2g}(S_2^2-S_1^2)$

representing

Drop in Pressure Energy =Gain in Kinetic Energy between A and B

As same mass of liquid flows through A and B

(8) M_t (flow in lbs./sec.)$=A_1uS_1=A_2uS_2$

$=\dfrac{3.1416}{4}\left(\dfrac{D}{12}\right)^2uS_1=\dfrac{3.1416}{4}\left(\dfrac{d}{12}\right)^2uS_2$

(9) or $S_1=\left(\dfrac{d}{D}\right)^2S_2$

Substituting this value of S_1 in equation (5)

(10) $\dfrac{1}{2g}\left[S_2^2-\left(\dfrac{d}{D}\right)^4S_2^2\right]=144\dfrac{H}{u}$

which reduces to

(11) $S_2^2=144\times\dfrac{H}{u}\times 2g\times\dfrac{1}{1-\left(\dfrac{d}{D}\right)^4}$

(12)

$S_2=\sqrt{144\times 2\times 32.174\times\dfrac{H}{u\left[1-\left(\dfrac{d}{D}\right)^4\right]}}$

(13) $=96.260\sqrt{\dfrac{H}{u\left[1-\left(\dfrac{d}{D}\right)^4\right]}}$

Substituting this value for S_2 in equation (8)
M_t (lbs. per sec.)$=A_2uS_2$

$=\dfrac{3.1416}{4}\left(\dfrac{d}{12}\right)^2\times u$

$\times 96.260\sqrt{\dfrac{H}{u\left[1-\left(\dfrac{d}{D}\right)^4\right]}}$

(14) $=\dfrac{0.5250\ d^2}{\sqrt{1-\left(\dfrac{d}{D}\right)^4}}\times\sqrt{u\,H}=$

theoretical discharge

For actual flow, the above theoretical flow must be adjusted for various conditions and effects which cause a deviation from the theoretical.

(15) $M_{(actual)}=CM_t=$

$C\times\dfrac{.5250\ d^2}{\sqrt{1-\left(\dfrac{d}{D}\right)^4}}\times\sqrt{uH}$

DERIVATION OF FLOW THROUGH AN ORIFICE FOR GAS

(As used in Bureau of Standards Buttonwillow Tests)

For the sake of obtaining a simple result, unlike actual conditions of flow, the

assumption is made that the density of the gas shall remain *constant* during the flow through the orifice instead of decreasing as it actually does. In other words, it is the same as saying that the gas acts like a liquid and therefore the same equation as the one used for liquids will apply to the flow of gas.

However, having assumed that the density of the gas shall remain constant, it now becomes necessary to choose the point at which the density will be taken.

Let u_1=density of gas at conditions P_1 and flowing temperature T_1 (or T ave.)
u_2=density of gas at conditions P_2 and flowing temperature T_2 (or T ave.)

For practical purposes T_1 and T_2 are taken in this report as the average of T_1 and T_2, for, due to the position of thermometer wells (12 diam. up and 12 diam. down) it has been found to be more nearly the true temperature of the gas just ahead of the orifice. Of course, for high rates of flow, T_1 and T_2 could not be the same, for the expansion through the orifice would naturally decrease the temperature. However due to the coldness of the gas from previous expansions through valves up stream, and the general higher temperature of the flow lines, T_2 often became higher than T_1, especially during small rates of flow. For high flow rates the value T_2 was generally lower than T_1, as would naturally have been expected.

For gas, therefore,

(16) M (flow in lbs. per sec.) =

$$C_1 \times \frac{0.5250\ d^2}{\sqrt{1-\left(\frac{d}{D}\right)^4}} \times \sqrt{u_1 H}$$

or

(17) M(flow in lbs. per sec.) =

$$C_2 \times \frac{0.5250\ d^2}{\sqrt{1-\left(\frac{d}{D}\right)^4}} \times \sqrt{u_2 H}$$

Where u_1 and u_2 are measured in lbs. per cu. ft.

Considering then that (T) is the same for both conditions and that the gas follows Boyle's Law regarding direct variation of density with pressure as has already been assumed for theoretical flow, it is seen from the above formulas (16) and (17) that

$$C_2 = C_1 \sqrt{\frac{u_1}{u_2}} \text{ or } C_1 = C_2 \sqrt{\frac{u_2}{u_1}}$$

First consider the gas as being air

The density of dry air containing the normal amount of CO_2 and at 32°F temperature and a pressure of 1 atmosphere or 14.696 lbs. per sq. in. is taken to be 0.08072 lbs. per cu. ft. The coefficient of expansion at the constant pressure of 1 atmosphere is taken to be 1/490 of the volume of the air at 32°F. which more nearly approaches the mean value as found by experiment for temperatures within the range of 32° F to 122° F than does the more commonly accepted coefficient (1/492) of the volume at 32° F.

Taking the up-stream pressure value of (U) it is seen that for conditions of temperature T and pressure P_1, the density of the air *if it followed Boyle's Law*, could be:

(18) u_1 (air) =

$$0.08072 \times \frac{P_1}{14.696} \times \frac{490}{(458 + t°F.)} =$$

$$(18)' = 2.6914 \left(\frac{P_1}{458+t}\right) \text{ lbs. per cu. ft.}$$

However,

$P_{14.696} \times V_{std}$ $(t=32°F)$ *does not equal* P_1V_1 $(t=32°F.)$

Actually the P_1V_1 values are smaller for higher pressures than those of standard conditions and must therefore be corrected by a factor (Y) to obtain the true density of the gas under the higher pressure conditions,

(19) $Y\ P_1V_1 = P_{std}V_{std}$ or $Y = \frac{P_{std}V_{std}}{P_1V_1}$

Derivation of flow for a gas of specific gravity G (air 1.00)

(20) $u_{\text{gas at std. cond.}} = G\, u_{\text{air at std. cond.}}$

For conditions of flow at a temperature T°F and a pressure P_1, the density becomes

(21) $(u_{1\,gas}) = 2.6914 \frac{P_1}{458 + t} Y_{gas} G$

The more correct form of equation (15) then becomes for above gas

$$M = C_1 \times 0.5250 \frac{d^2}{\sqrt{1-(d/D)^4}} \sqrt{H} \times \sqrt{\frac{2.6914\ P_1\ Y\ G}{458+t}}$$ lbs. per sec. (or)

Let W′=weight in lbs. of 1 cu. ft. of gas under a pressure of 14.65 lbs. per sq. in. abs. and temp of 60°F.

As previously mentioned the weight of one cubic ft. of air at 32°F and 14.696 lbs. per sq. in. abs. was .08072 lbs. Using absolute zero temp. of −458°F and a gas of gravity G (air 1).

$$W' = \frac{14.65}{14.696} \times \frac{490}{518} \times .08072 \times G =$$

.076117 G = Weight of 1 cu. ft. of gas at std. cond. of P = 14.65 lbs. per sq. in. and t = 60° F.

Formula (22) then becomes (Dividing by W′),

(23) $M = C_1 \times 11.316 \times \frac{d^2}{\sqrt{1-(d/D)^4}} \sqrt{\frac{P_1HY}{TG}}$

Cu. ft. per sec. at Std. Cond.
P_s=14.65 lbs. per sq. in. and
T_s=60°F.

(24) $M = C_1 \times 40738 \times \frac{d^2}{\sqrt{1-(d/D)^4}} \sqrt{\frac{P_1HY}{TG}}$

Cu. ft. per hour at above Std. Cond.

The discharge coefficient (C_1') has been found to vary as the values of $\frac{H}{P_1}$ and $\frac{d}{D}$ change. By experiment it has been determined that this variance for flange tap connections follows the formula, for lower pressure at least,

(25) $C'_1 =$

$$0.5970 + 0.12\left(\frac{d}{D}\right)^4 - 0.6 \times \left(\frac{d}{D}\right)^{12} - 0.115\left[\frac{H}{P_1} + \left(\frac{H}{P_1}\right)^2\right] \times \left[1 + 1.5\left(\frac{d}{D}\right)^4\right]$$

where (H) in this case, equals differential in lbs. per sq. in.

TABLE NO. 1

Coefficients calculated by formula (24) for the three test plates used in the tests at Buttonwillow (Gravity of gas est. at G = .565).

Plate	No. 1	No. 2	No. 3
Nominal size of plate	4 x 1	4 x 1.9	4 x 2.5
D = inter. diam. of Test Line (In.)	3.825	3.825	3.825
d = diameter of orifice (In.)	.9998	1.899	2.500
d^2	.9995	3.608	6.250
(d/D)	.2614	.4965	.6536
$1/\sqrt{1-(d/D)^4}$	1.002	1.031	1.106
$d^2/\sqrt{1-(d/D)^4}$	1.002	3.721	6.912
Value of $\left[40738 \times \frac{1}{\sqrt{G}}\left(\frac{d^2}{\sqrt{1-(d/D)^4}}\right)\right]$	54,300	201,700	374,600

(22) $M = C_1 \times 0.86126 \times \frac{d^2}{\sqrt{1-(d/D)^4}} \sqrt{\frac{P_1HYG}{T\ °F.\ Abs}}$ lbs. per sec.

To convert the flow in lbs. per sec. to an equivilant flow of gas in (Cubic ft. per hr. at standard conditions, pressure taken at 14.65 lbs. per sq. in. and temperature of 60°F), it is first necessary to find the weight of gas per cu. ft. under these standard conditions.

Gas flow as measured by either line or flange tap methods is calculated by the following formulas for the three test plates.

$(24)_1$

Plate No. 1 $M = 54{,}300 \times C_1 \sqrt{\frac{P_1HY}{T}}$

Cu. ft. per hr. Std. Cond.
P_s=14.65 T_s=60° F

$(24)_2$

Plate No. 2 $M = 201{,}700 \times C_1 \sqrt{\frac{P_1 H Y}{T}}$

Cu. ft. per hr. Std. Cond.

$(24)_3$

Plate No. 3 $M = 374{,}600 \times C_1 \sqrt{\frac{P_1 H Y}{T}}$

Cu. ft. per hr. Std. Cond.

Note:

C_1 is a variable and is the value sought

P_2=upstream pressure in lbs. per sq. in. absolute

T=flowing abs. temp. gas°F (zero=−458°F) Taken as the average of the up and down stream temp. in this test.

$H = (P_1 - P_2)$ = Differential in lbs. per sq. in.

Y=Compressibility factor of gas (from Fig. 4) for the corresponding values of P_1 and T.

METHOD FOLLOWED IN CALCULATING TEST RESULTS

Considering first the volumes as computed by Formula (24) and neglecting temporarily the compressibility factor (Y) the flow through the two 10-in. lines can be equated to the flow through the 4-in. test line as there is no other path for the gas to follow, or

(26)

$$\left[C'_1 \times \frac{40738 \times d^2}{\sqrt{1-(d/D)^4}} \sqrt{\frac{P_1 H}{TG}}\right]_{10'' \text{ No. } 1} + \left[C'_1 \times \frac{40738 \times d^2}{\sqrt{1-(d/D)^4}} \sqrt{\frac{P_1 H}{TG}}\right]_{10'' \text{ No. } 2} = \left[C'_1 \times \frac{40738 \times d^2}{\sqrt{1-(d/D)^4}} \sqrt{\frac{P_1 H}{TG}}\right]_{4''}$$

For any one line and orifice size, the value of $[d^2/\sqrt{1-(d/D^4)}]$ is a constant, and these values for the three test line plates are listed in Table No. 1. These same values were also computed for each reference plate and line, but the results are not listed in this report. By keeping the pressures and differentials on the two 10-in. lines within fairly close limits of (15 to 20) lbs. per sq. in. gauge pressure and differentials less than 50 in. of water the values of C'_1 could be considered as correct when computed by formula (25).

The first step, then, was to compute values of C'_1 for each set of plates used in the two sets of 10-in. lines. Enough values were computed for changes in $(P_1 - P_2)/(P_1 \times .07365)$ so that curves for each of these plates could be drawn to take care of any differential and pressure to be used in the test. These curves consisted of values of C'_1 plotted against values of $(P_1 - P_2)/(P_1 \times .07365)$ or actually against (Diff. in in. of water)/(P_1 in inches Hg abs.). These curves are not shown in this report, but they follow generally the same trend as do the discharge coefficient curves shown in Fig. 5 for the 4-in. line plate. The values of C'_1 for these two 10-in. line plates were fairly constant as the range of $(P_1 - P_2)/(P_1 \times .07365)$ used was fairly small. Considering these values of C'_1 for the 10-in. line plates as being correct, the discharge coefficients could be computed for the 4-in. line plates from the differential and pressure reading recorded in the tests by taking out the common factor $40738 \times \sqrt{1/G}$ from formula (26) and solving for the 4-in. value of C'_1 and temporarily neglecting the deviation correction for Boyle's Law.

(27) C'_1 (for 4″) =

$$\left[C'_1 \frac{d^2}{\sqrt{1-(d/D)^4}} \sqrt{\frac{P_1 H}{T}}\right]_{10'' \text{ No. } 1} + \left[C'_1 \frac{d^2}{\sqrt{1-(d/D)^4}} \sqrt{\frac{P_1 H}{T}}\right]_{10'' \text{ No. } 2}$$

$$\left[\frac{d^2}{\sqrt{1-(d/D)^4}} \sqrt{\frac{P_1 H}{T}}\right]_{4''}$$

From (27) it is seen that any units might be used for values of P_1 and (H) as long as each one of the values are expressed in the same units throughout. In the field C'_1 was computed for every run and is shown on the data sheets, and P_1 was expressed in inches Hg Abs. and (H) in inches of water.

It is seen from Fig. 4 that (Y) for pressures and temperatures used in the 10-in lines is a negligible quantity amounting to not over 1.002 and as (Y) is under the square root radical this reduces to 1.001 which becomes negligible when compared to other experimental errors etc. For the 4-in. line however, the value (Y) is extremely important at all pressures above the 20 lbs. per sq, in. gauge series. $(C'_1)4''$ then must be corrected for (Y) as it includes the $\sqrt{Y}$ and is not a true hydraulic coefficient. It follows that,

(28) $C'_1 = C_1 \sqrt{Y_4''}$ or $C'_1 = C_1 \sqrt{\frac{Y_4''}{Y_{10}''}}$

(if 10″ lines were under higher pressures).

(29) $C_1 = C'_1/\sqrt{Y_4''}$ (When reference line is under low pressure).

As it was necessary that all differentials and pressures be kept in the same system of units throughout, conversion factors were necessary and those used were taken from curves which showed the variation of the conversion factors with temperature. In the field, all differentials were converted into inches of water while pressures were converted into inches of mercury absolute.

COMPARISON OF BUREAU OF STANDARDS FORMULA TO THOSE USED COMMERCIALLY

Consider first the formula derived by Foxboro with the additional Boyle's Law deviation factor $\sqrt{Y}$ included, gives

(30) $M = KC_v d^2 \frac{T_b}{P_b} \sqrt{\frac{HPY}{TG}}$

In the above equation K=218.44 and is a constant depending on the units used, the conversion factors used, etc. Giving the value of 60°F or (460+60)=520°F abs. to T_b and the value of 14.65 lbs. per sq. in. to P_b and also giving K its value 218.44 (30) becomes

(31) $M = 7754\ C_v d^2 \sqrt{\frac{HPY}{TG}}$

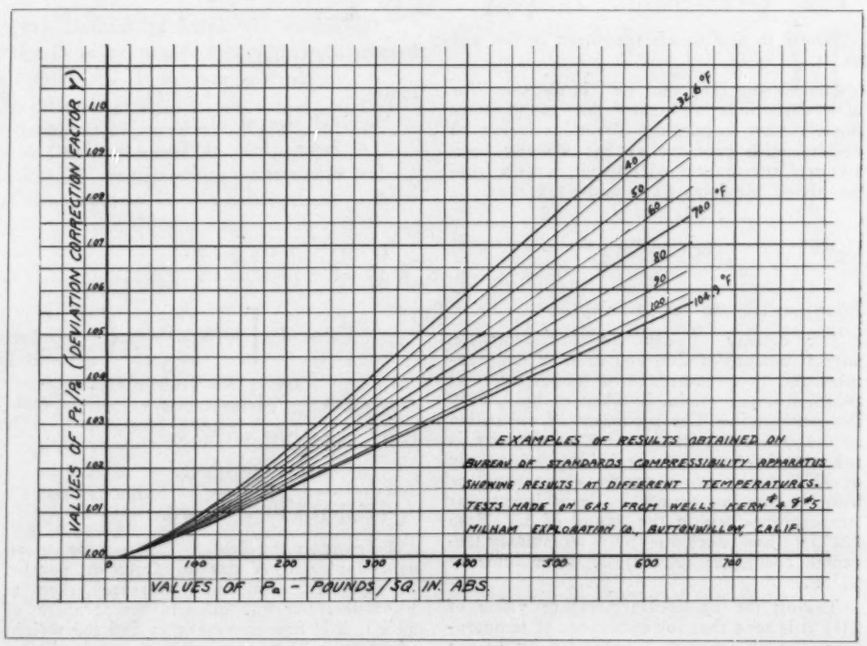

VALUES OF P_a/P_a (DEVIATION CORRECTION FACTOR Y)
VALUES OF P_a - POUNDS/SQ. IN. ABS.
EXAMPLES OF RESULTS OBTAINED ON BUREAU OF STANDARDS COMPRESSIBILITY APPARATUS SHOWING RESULTS AT DIFFERENT TEMPERATURES. TESTS MADE ON GAS FROM WELLS KERN #4 & #5 MILHAM EXPLORATION CO. BUTTONWILLOW, CALIF.
32° 40° 50° 60° 70° 80° 90° 100° 104.3°F

Fig. 4

Here the value of C_v is taken as a constant for any one plate and hookup. This may be broken up into two separate factors as follows:

(32) $C_v = B\ (1/\sqrt{1-(d/D)^4})$ or

$$B = \frac{C_v}{1/\sqrt{1-(d/D)^4}}$$

The factor $1/\sqrt{1-(d/D)^4}$ is a constant for any one line and orifice size and is the correction for the velocity of approach. The factor B is also taken as a constant commercially and represents the average value of the discharge coefficient. However, when B is taken as a constant further corrections become necessary to obtain actual flow.

Replacing C_v in (31) by its value shown in (32), changes (31) to,

(33) $$M = 7754\ B \frac{d^2}{\sqrt{1-\left(\frac{d}{D}\right)^4}} \sqrt{\frac{HPY}{TG}}$$

Where

d and D are in inches

P=abs. Press. lbs. per sq. in.

G=gravity (air 1.00)

H=diff. in in. water at 60°F

Comparing (33) with formula (24) as shown in the previous derivation, the only apparent difference between the two is the constant 7754 and 40738, the factor B being equivilant to C_1. All other items but the value T are expressed in the same units. As H in formula (33) is expressed in (in. of water) and in (24) in (lbs. per sq. in.) formula (24) can be changed as follows—(1 lb. per sq. in.)=(1/.03609) or 27.709 inches of water at 60°F. Changing (H) in (24) to inches of water requires that the constant 40738 be multiplied by $\sqrt{1/27.709}$= 1/5.2639 which changes it to 7739, formula (24) becoming—

(34) $$M = C_1 \times 7739 \frac{d^2}{\sqrt{1-(d/D)^4}} \sqrt{\frac{HPY}{TG}}$$

Had the same basic absolute temperatures been used in both (34) and (33) constant 7739 would have been equal to 7754 as can be shown.

T in (33) is 460+t or for standard conditions 460+60=520

T in (33) is 458+t or for standard conditions 458+60=518

For comparative purposes of this report, if the base temperature is changed to 458 instead of 460, the constant in (33) must be multiplied by the factor

$$\sqrt{(458+60)/(460+60)} \quad \text{or} = \sqrt{(518)/(520)}$$

and (33) becomes identical to (34) except for the interpretation of C_1 and B. Equation (33), the commercial formula, for comparative purposes becoming

(35) $$M = 7739\ B \frac{d^2}{\sqrt{1-(d/D)^4}} \sqrt{\frac{HPY}{TG}}$$

Where:

T=458+°F

P=upstream pressure

Equating (35) to (34) would make B=C_1. However C_1 is a known variable, therefore B (a constant) cannot=C_1 or,

(36) C_1 = FB or F = $\frac{C_1}{B} = \frac{C_1}{Cv \times 1/\sqrt{1-(d/D)^4}} = \frac{C_1}{\text{(a constant)}}$

This factor (F) then, is the correction factor which must be applied to any volumes computed by commercial formula using upstream pressure P_1 and might be inserted in formula (35) when P_1 is the pressure used, as follows:

(37) $$M = 7739\ FB \frac{d^2}{\sqrt{1-(d/D)^4}} \sqrt{\frac{HPY}{TG}}$$

If the downstream pressure P_2 is the pressure used, (taking Y, however, for condition P_1) a further correction is needed for $\sqrt{P_1}=X\sqrt{P_2}$ or $X=\sqrt{P_1/P_2}$, making the correction factor,

(38) Cor. Fac.=$F\sqrt{P_1/P_2}$ and might be inserted in formula (35) as follows when P_2 is the pressure used.

(39) $$M = 7739 \times F \times \sqrt{P_1/P_2} \times B \times \frac{d^2}{\sqrt{1-(d/D)^4}} \sqrt{\frac{HPY}{TG}}$$

(39)′ If Y is to be taken from condition P_2 when P_2 is the pressure used to obtain the correction factor from the test data C_1, the additional correction factor $\sqrt{Y_{p1}/Y_{p2}}$ is needed.

The procedure followed in this report was to first arrange the data so that C'_1 might be computed. This was done entirely in the field by use of (27) in which P_1 the initial abs. pressure, was expressed in inches of Hg. at atmosp. temp. and (H), the differential was expressed in inches of water at atmosp. temp.

For matters of information as well as to obtain the deviation factor (Y) from the compressibility curve Fig. 4, the absolute initial pressures were converted back to lbs. per sq. in. abs. The differential (H) was then converted to lbs. per sq. in and the ratio of H/P_1 or $(P_1-P_2)/P_1$ calculated for plotting purposes as well as for general information.

Knowing C'_1 from the field computations and also the value of Y for the pressure and temperature conditions of each run (See Fig. 4) the value of C_1 was next computed by means of formula (29) or $C_1=C'^2_1/\sqrt{Y}$

The correction factors which must be applied to volumes computed by commercial formula were then calculated from (36) and (38) for the three methods of computing, that is by the line tap method using P_1 and by the flange tap method using both P_1 and P_2.

For information only, actual flow volumes were next computed by formulas $(24)_1$, $(24)_2$, and $(24)_3$.

To obtain the correction factors from data obtained in this test which must be applied to volumes computed by ordinary methods it was first necessary to find the value of C_v for the particular hookup considered. This value can usually be obtained closely enough from tables but can be calculated by the following method if desired,

For Flange Taps

(40) $C_v=.606+[1.25(d/D-.41)^2]$ for d/D greater than .41
$=.606$ for d/D less than .41

For Line Taps

(41) $C_v=.58925+.2725\ (d/D)-.825\ (d/D)^2+1.75(d/D)^3$

Where d=orifice dia. and D= internal dia. line (Both in same units).

TABLE NO. 2

Values of C_v and B for the three test plates in the 4-in. line.

	C_v	$\frac{1}{\sqrt{1-(d/D)^4}}$	$B = \frac{C_v}{1/\sqrt{1-(d/D)^4}}$
4 x 1 flange	.606	1.002	.6048
4 x 1 line	.6354	1.002	.6341
4 x 1.9 flange	.6153	1.031	.5968
4 x 1.9 line	.7354	1.031	.7133
4 x 2.5 flange	.6802	1.106	.6150
4 x 2.5 line	.9036	1.106	.8170

SAMPLE CALCULATIONS RUN NO. 119—FLANGE TAPS

	Test Line	Ref. No. 1	Ref. No. 2
Plates in use	4x1	10x5	10x5
Atmoshperic temperature 76°F			
Barometric pressure 29.85 in. Hg. at 74°F			
d=actual orifice diam. in inches	.9998	4.999	5.000
D=actual internal pipe diam. in inches	3.825	10.26	10.24
P_1 gauge (lbs. per sq. in.)	417.15		
P_1 gauge (in. Hg) 417.15 (1/.489)	853.1	26.54	26.81
P_1 abs. (in. Hg) 853.1+29.85	882.95	56.39	5666
P_1 abs. (lbs. per sq. in.) 882.95×.489	431.8		
P_2 gauge (lbs. per sq. in.)	236.33		
H = ($P_{1gauge}-P_{2gauge}$) (lbs. per sq. in.)	181.17		
H=Diff. (Inches water) 181.17×(1/.036025)	5029.	23.72	22.99
Average Temp. Flowing Gas °F	54.9	39.4	39.6
Average Temp. Flowing Gas T=t+458	512.9	497.4	497.6
Y=devia. cor. for Condition $P_1$and T of gas Fig. 4	1.054	1.00	1.00
Y=devia cor. for Condition P_2 and T of gas Fig. 4	1.026	1.00	1.00
C'_1 by formula (25) or from curves (Not shown)		.5998	.5999
B from Table No. 2	.6048		

Calculation of C'_1 from above data by formula (27)

$$C'_1\ (4'') = \frac{\left[.5998\times25.72\sqrt{\frac{56.39\times23.72}{497.4}}\right]_{10''\ \text{No.1}} + \left[.5999\times25.74\sqrt{\frac{56.66\times22.99}{497.6}}\right]_{10''\ \text{No.2}}}{\left[1.002\times\sqrt{\frac{882.95\times5029.}{512.9}}\right]_{4''}}$$

$$= 0.5393$$

Calculation of C_1 from formula (29)

$$C_1 = \frac{C'_1}{\sqrt{Y}} = \frac{.5393}{\sqrt{1.054}} = \frac{.5393}{1.027} = .5251$$

The ratio of $\frac{(P_1-P_2}{P_1}$ or $\frac{H}{P}$ =

$$\frac{181.17}{431.8} = .4196$$

Calculation of the correction factor required to apply on volumes computed by commercial formulas—

(A) Using upstream pressure P_1 (Formulas 36 and 37)

Correction factor $= C_1/B = .5251/.6048 = .8682 = F$

(B) Using downstream pressure the correction factor (if Y is taken for P_1) (Formulas 38 and 39)

$$= .8682 \times \sqrt{P_1/P_2} =$$

$$.8682\ \sqrt{431.8/250.6} = 1.140$$

Actual volume can then be computed by means of formula (24)

(B)′ Using downstream pressure (and Y for condition P_2) the correction factor becomes (Formula 39′)

$$= .8682\times\sqrt{\frac{431.8}{250.6}}\times\sqrt{\frac{1.054}{1.026}} = 1.156$$

$$M = 54300\times.5251\times\sqrt{\frac{431.8\times181.17\times1.054}{512.9}} = 361.5 \text{ cu. ft.}$$

per hour at Std. Cond.

DISCUSSION OF CURVES AND RESULTS

The curve sheet Fig. 4 giving the Boyle's Law Deviation factor for the gas tested shows that temperature has a marked effect on this deviation factor, especially for the higher pressures, the higher the temperature for any given pressure the lower the deviation. This variation also increases as the pressure increases for corresponding changes in temperature. The factor is a straight line function of the pressure at constant temperature between the 200 to 600 lbs. per sq. in. absolute values of P_1 or P (actual) for this gas at least. For pressure below 200 lbs. per sq. in. absolute, the deviation factor does not follow the straight line function with pressure at constant temperature, but curves slightly, and the curves for all temperatures shown converge to the value 1.00 for the deviation factor when the pressure becomes atmopsheric. Only three original curves were made, these being for 32.6° F, 70° F, and 104.9° F., the other curves shown being filled in by estimation.

To obtain this factor for other gases it will be necessary to run many more tests, especially for mixed gases or vapors, such as natural gases containing rich gasoline vapors, and the richer this gas, probably the greater the deviation will be and also the more difficult will it be to obtain. Possibly each gas under consideration should be tested separately for best results. Tests are now planned by which this factor can be obtained for almost any of these rich natural gases, the method proposed being to first run tests on the various constituents found in these gases, the compressibility or deviation factor to be found for each individual constituent over complete ranges of pressure with the gas held at a constant temperature, and then to make other runs at other temperatures until the deviation factor can be found for any one constituent at any ordinary pressure or temperature. With these data it is thought that by applying the idea of partial pressures, the deviation factor for any natural gas could be computed from the analysis of the gas.

Figs. 5 and 6, showing the hydraulic discharge coefficients C'_1 and C_1 plotted against the ratio $(P_1-P_2)/P_1$ for the 4-in. x 1-in. plate, indicate that this coefficient is almost

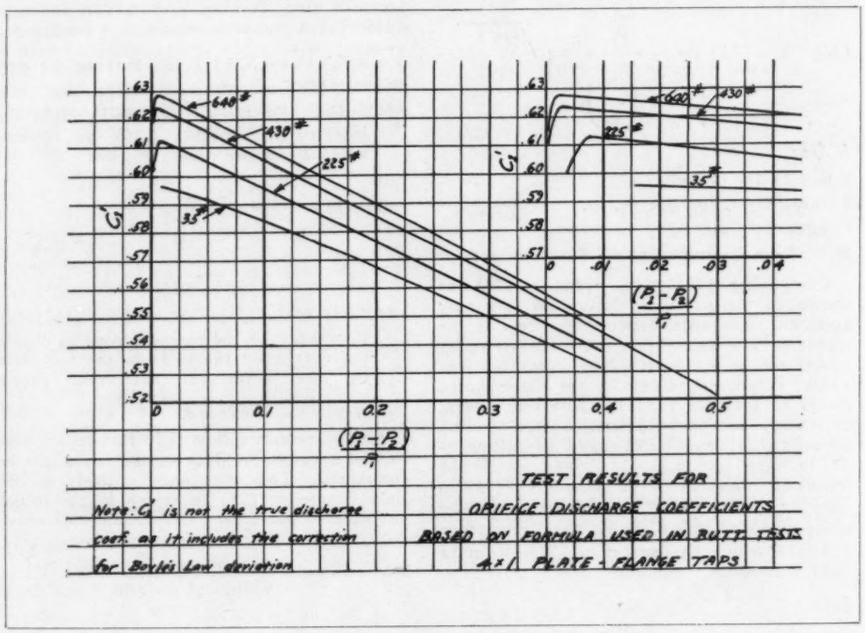

640#
430#
225#
35#
G'
(P1-P2)/P1
Note: G' is not the true discharge coef. as it includes the correction for Boyle's Law deviation
TEST RESULTS FOR ORIFICE DISCHARGE COEFFICIENTS BASED ON FORMULA USED IN BUTT. TESTS 4 x 1 PLATE-FLANGE TAPS

Fig. 5

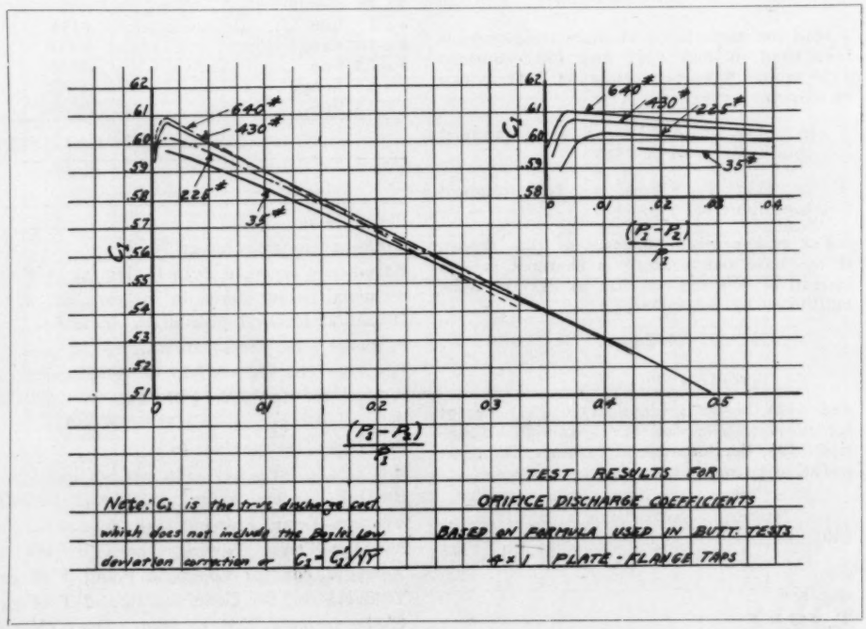

640#
430#
225#
35#
G'
(P1-P2)/P1
Note: G1 is the true discharge coef. which does not include the Boyle's Law deviation correction or G1=G'1/Y
TEST RESULTS FOR ORIFICE DISCHARGE COEFFICIENTS BASED ON FORMULA USED IN BUTT. TESTS 4 x 1 PLATE-FLANGE TAPS

Fig. 6

directly proportional to the variation in the ratio of pressure drop across the orifice to the upstream pressure both for flange tap and line tap methods. As the values of (C'_1), shown in Fig. 5, include the deviation or compressibility factor, (that is the volumes computed *have not* been corrected by this deviation factor) these curves show distinctly that a correction for pressure or density is needed. The curves for C_1 (Fig. 6), which value is the discharge coefficient after volumes have been corrected for Boyle's Law deviation, show that the application of this compressibility factor does bring the curves of (C_1) down to almost one line for all pressures, indicating that the method used in applying this factor was correct. For low values of $(P_1-P_2)/P_1$ attention might be drawn to the slight but distinct variation of C_1 with pressure.

Fig. 7 shows correction factors needed to apply on volumes computed by standard commercial formulas corrected for Boyle's Law Deviation, plotted against ratios of $(P_1-P_2)/P_1$ for the 4-in. x 1-in. plate. Values of these factors were computed and plotted for the three methods of calculation used. This curve indicates that by using the average of P_1 and P_2, or in other words, approximately true density, a comparatively close estimate of the true flow might be obtained when running high differentials.

On the main curves, in Figs. 5, 6, and 7, the points computed for the four series of pressures were plotted against the above ratios, for each plate size. Details of the lower portions of these curves, that is for lower ranges of $\frac{P_1-P_2}{P_1}$, were plotted on the curves to the right of each main curve, this portion of the curve being where most readings are taken commercially.

Curves (not shown) giving correction factors plotted against actual differentials show results very similar to those obtained from the former curves only that in this case the results obtained are comparable to actual differential drops and not ratios of $\frac{P_1-P_2}{P_1}$. Combination curves (not shown) indicate quite clearly that the volumes computed by ordinary coefficients even though they have been corrected for deviation from Boyle's Law, are not exactly accurate even for the differentials between (0 and 100) inches of water.

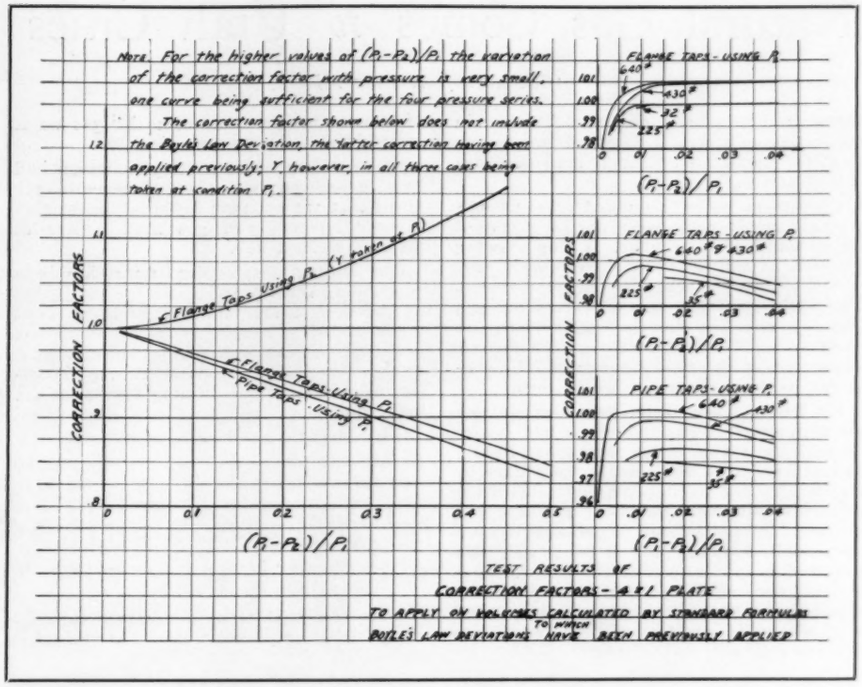

Note. For the higher values of (P1-P2)/P1 the variation of the correction factor with pressure is very small, one curve being sufficient for the four pressure series. The correction factor shown below does not include the Boyle's Law Deviation, the factor correction having been applied previously; however, in all three cases being taken at condition P1.
CORRECTION FACTORS
Flange Taps Using P2 (Y taken at P1)
Flange Taps Using P1
Pipe Taps Using P1
(P1-P2)/P1
FLANGE TAPS - USING P2
640#
430#
225#
FLANGE TAPS - USING P1
PIPE TAPS - USING P1
TEST RESULTS OF
CORRECTION FACTORS - 4 x 1 PLATE
TO APPLY ON VOLUMES CALCULATED BY STANDARD FORMULAS TO WHICH BOYLE'S LAW DEVIATIONS HAVE BEEN PREVIOUSLY APPLIED

Fig. 7

CONCLUSIONS AND DISCUSSION OF RESULTS

(1) This report is not a finished one, as the data, calculations, etc., are unchecked; it does, however, give general trends and results which might be expected and is probably accurate within one or two per cent in most cases.

(2) Fig. 4 giving the results of tests run on the U. S. Bureau of Standards Compressibility Apparatus is probably very accurate *for this one gas tested,* but the results obtained can only be applied to the measurements of gases which have the same constituents as that tested. It also shows that this correction is a decidedly important one which may effect the volumes calculated by ordinary formulas as high as 4 per cent or more in the case of the very rich vapors. The adjustment for this deviation is, within ordinary pressure limits above atmospheric, a plus correction to volumes as now calculated. In the case of this dry gas tested, the deviation from Boyle's Law amounted to as high as 1.09 or 9 per cent error in pressure or density for a 600 lb. absolute pressure and a low temperature of 32° F, or an error of $\sqrt{1.09}=1.044$ or 4.4 per cent error in volumes as computed by orifice meter. Temperature of the gas was found to have a decided effect on the compressibility factor, the factor increasing as the temperature lowered especially at higher pressures.

(3) The correction factors used in computing by commercial flange tap methods (using P_2). were greater than one for almost all values of $\frac{P_1-P_2}{P_1}$, indicating that volumes ordinarily computed by this method have a tendency to be low for high values of this ratio. For flange taps using P_1 the correction factor is increasingly less than one, indicating larger volumes than actual as the $\frac{P_1-P_2}{P_1}$ ratio increased. For line taps the same general result was obtained as for flange taps using P_1.

(4) The value of the so-called Velocity coefficient (C_v) as used in the ordinary methods of computing gas volumes is not a constant as generally assumed.

(5) As this is an unofficial report, much of the actual data and tabulated results, as well as complete sets of curves, together with many conclusions derived from the plotting of these curves, have necessarily been omitted. The official report will soon be published by H. S. Bean, Physicist of the U. S. Bureau of Standards.

DIXIE GAS & FUEL CO. OPERATES LUFKIN, TEXAS, GAS CO.

Dixie Gas & Fuel Company, a United Gas Company property, is now supplying natural gas at Lufkin, Texas, having recently taken over the city distribution system from the Lufkin Natural Gas & Fuel Co. Gas had formerly been purchased by the Lufkin company, at the city gate, from the Dixie Gulf Gas Company, a sister company of the Dixie Gas & Fuel.

The company is also distributing gas at Sour Lake, Texas, following the completion of a distribution system there, and the laying of a 5-mile gas line to connect with the Northeast Texas to Port Arthur trunk line of the Dixie Gulf Gas Company.

ARKANSAS POWER & LIGHT GETS NEWPORT, KAN., FRANCHISE

A gas franchise has been granted the Arkansas Power & Light Company at Newport, Arkansas, according to report. Jonesboro, Searcy and other towns in this section will receive gas from the Monroe to St. Louis gas line, at its completion, it is said. W. H. Howze is the local manager of the company at Newport.

CITIES SERVICE SYSTEM TO EXTEND TO SASAKWA AREA

The system of the Cities Service Gas Company, serving the Little River area in Oklahoma, is being extended into the Sasakwa area by the construction of a 6½-inch pipeline approximately nine miles long. Work has been started by the Cities Service Gas Company also on a natural gas pipeline from the Dilworth compressor station to a point near Orlando, Okla. This line will pass near the Otstot booster station and go directly south. From Orlando gathering lines will be laid into the Marshall and Lovell gas fields.

PUEBLO GAS & FUEL CO. SPENDS $200,000 ON IMPROVEMENTS

More than $200,00 has been expended during the past 12 months by the Pueblo Gas & Fuel Company in an improvement program inaugurated by the company, according to A. M. Talbott, general manager.

During that period there were 28.3 miles of new mains laid, and 6.5 miles of mains repaired and rebuilt.

Natural Gas Comes *to* Utah Cities

(Continued from Page 40)

warning that natural gas would arrive in the section on a certain date and gave directions for appliance operation until our men should arrive.

Consumers were requested not to use water heaters nor ovens on ranges until adjustment had been made. A map showing the sections and the order in which gas was turned in was printed in all newspapers. The business district was converted Sunday, Monday, and Tuesday, gas being turned in at 11:30 p.m. Saturday night so that the gas equipment of the newspapers could be converted without inconvenience to them.

Six hundred consumers were served from the high pressure gas line of the old system through individual house regulators. Manufactured gas was displaced in these lines by natural gas and appliance adjustments made as soon as this was completed. Pressure was dropped to four ounces, regulators blocked open with shipping pins at once, and then removed as soon as convenient and the service line tied together again. The procedure was followed at Ogden, except that the crew was somewhat smaller, and the town was divided into only two districts.

The entire change-over for both towns required 24 working days and was accomplished without an accident, fire, or explosion of any kind whatever.

A number of false alarm fire calls went in, due to people seeing the manufactured gas flaming from the top of the bleeders, and thinking some house was on fire. It was of course necessary to burn the gas as it escaped from the bleeders.

Meanwhile a house heating campaign had been going forward since June with the result that we are now installing conversion furnace burners and gas fired boilers at the rate of 30 a day.

Our industrial sales department has been functioning since March, with the result that by the first of the year our industrial sales are expected to exceed 20,000,000 cubic feet per day. Expert engineering knowledge is at the disposal of the customer, and installations of modern gas burning equipment are made daily.

The domestic gas rate is as follows:

1st 400 cubic feet	90c
Next 600 cubic feet	15c per 100 cu. ft.
Next 1000 cubic feet	12c per 100 cu. ft.
Next 1000 cubic feet	7½c per 100 cu. ft.
Next 2000 cubic feet	6c per 100 cu. ft.
All over 5000 cubic feet	5c per 100 cu. ft.

Minimum bill—90c per month.

This rate enables us to compete satisfactorily with domestic coal and domestic burner oil.

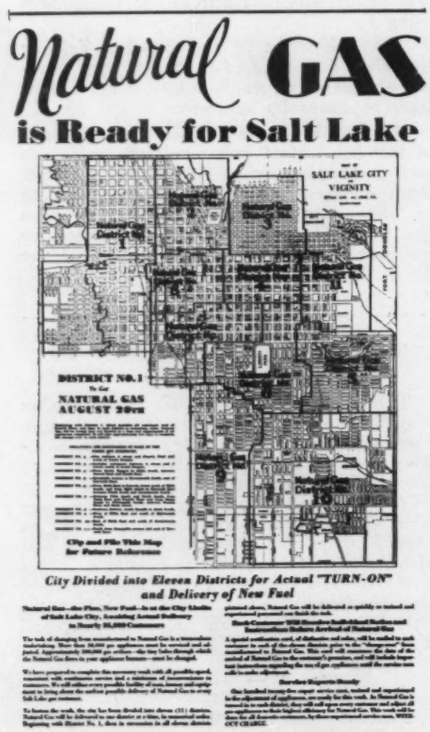
Our industrial rates are divided into five classifications according to quantity, use, and priority of service, and are finding ready acceptance.

In addition to the two cities above mentioned, six towns south and west of Salt Lake City are piped for gas, as well as the five towns between Salt Lake and Ogden.

This system of cities and towns is served by a main line running from the junction of the field lines at Green River, Wyoming, to Coalville, Utah; thence, branching with a 16-inch line to Salt Lake City and a 14-inch line to Ogden; and connection of Ogden and Salt Lake City is with a 10-inch line.

Franchises have been taken at Brigham City, and all towns in Cache Valley to the north, which will require an additional extension of 75 miles of main line.

The accompanying tables of statistics give the amount of construction work and the time occupied by the change-over.



City Divided into Eleven Districts for Actual "TURN-ON" and Delivery of New Fuel

Salt Lake City was districted for the turn-on of natural gas, and consumers were reached by a thorough campaign of publicity, an example of which is the above advertisement, reproducing the map of natural gas districts.

MAIN LINE AND FIELD LINES

18-inch	122 miles
16-inch	105 miles
14-inch	52 miles
10-inch	33 miles
8-inch	16 miles

SALT LAKE CITY
Distribution System Improvements

City Gate Stations	3
New District Regulator Stations	21
16-inch I.H.P. Line	13.7 miles
12-inch I.H.P. Line	4.5 miles
10-inch I.H.P. Line	1.0 miles
8-inch I.H.P. Line	2.0 miles
6-inch I.H.P. Line	4.5 miles
4-inch I.H.P. Line	1.0 miles
6-inch Low Pressure Cast Iron Mains	7.4 miles
4-inch Low Pressure Cast Iron Mains	5.5 miles

OGDEN
Distribution System Improvements

City Gate Stations	2
New District Regulator Stations	16
10-inch I.H.P. Line	5.0 miles
8-inch I.H.P. Line	3.5 miles
6-inch I.H.P. Line	4.1 miles
4-inch I.H.P. Line	1.0 miles
6-inch Low Pressure Cast Iron Mains	6.0 miles
4-inch. Low Pressure Cast Iron Mains	13.5 mains

OTHER TOWNS

District Regulators	21
4-inch Steel Mains	43.4 miles
3-inch Steel Mains	19.8 miles
2-inch Steel Mains	7.9 miles

CHANGE-OVER STATISTICS
Salt Lake City

District	Number of Meters	Time Required—days
1	827	1
2	2162	2½
3	1831	2
4	2923	3
5	932	1
6	1714	1
7	1867	1½
8	1985	2
9	922	1
10	949	1
11	1131	1
high pressure	623	1
	Ogden	
1	2750	4 days
2	250	½ day

Rocky Mountain Gas Group Organizing

MEETING in joint session at Glenwood Springs, Colo., September 2, 3 and 4, the Colorado Utilities Association, the Rocky Mountain Division of the N. E. L. A., and the Wyoming Utilities Association, held their 26th, 10th and 8th annual conferences, respectively. Utility properties of the Rocky Mountain region were well represented in the three-day session, headquarters for which were at the Colorado Hotel.

F. T. Parks

One primary purpose of the meeting was the organization of a Rocky Mountain Utilities Association, an important unit of which will be the Rocky Mountain Gas Association now in progress of formation as a result of the Glenwood Springs conference. Affiliation of the gas division with the American Gas Association will tie this Rocky Mountain unit of the gas industry closely into the national program. The A. G. A. was represented at the conference by its vice-president, B. J. Mullaney, and by Managing Director Alexander Forward, both of whom took an important part in the speaking program—Mr. Mullaney, with an address on "The Gas Industry of Today," and Mr. Forward in a review of "A. G. A. Plans."

On Tuesday afternoon, September 3, representatives of gas utilities from New Mexico, Colorado and Wyoming held a conference at which highly favorable reaction to the plan for forming a Rocky Mountain Gas Association was manifest. Fifteen companies operating in the three states named were represented and it is anticipated that gas men of Montana, Utah and West Texas will be invited to come within the scope of the new organization.

As a result of the September 3 conference a committee was delegated to draw up a constitution and by-laws to submit to the companies concerned. F. T. Parks, manager of the natural gas department of the Public Service Company of Colorado, Denver, Colo., is chairman of this committee, assisted by A. M. Talbot, manager of the Pueblo Gas & Fuel Company, Pueblo, Colo.; Ward W. Husted, manager of the Laramie Gas

Company, Laramie, Wyo., and Arthur Prager, manager, Albuquerque Gas & Electric Company, Aubuquerque N. M.

When this committee's plan of organization is complete and has the approval of the various gas companies in the section, a set of officers will be named to act for the first year, so that the association may enter at once upon its service to the expanding Rocky Mountain gas industry.

Program Forms *for* Line *to* San Diego

IN pursuance of plans for bringing natural gas to San Diego, California, a hearing was held by the California Railroad Commission at San Diego on September 25 at which the San Diego Consolidated Gas and Electric Company and the Southern Counties Gas Company were represented.

Supervisors of San Diego County had previously granted the Southern California Gas Company permission to lay a line to San Diego, which franchise was subsequently transferred to the Southern Counties Gas Company. At the hearing of September 25 the Southern Counties Gas Company sought a certificate of public convenience and necessity to exercise this franchise and lay a 12¾ inch O. D. line from Huntington Beach to La Jolla, a distance of 80 miles.

From La Jolla the San Diego Consolidated Gas and Electric Company plans to construct a 12-inch line a distance of 14 miles to tie into its San Diego system.

The cost of the Southern Counties line is placed at $1,200,000, including a compressor plant at Huntington Beach. This plant will have 15 million cubic feet daily capacity, to be later raised to 26 million cubic feet—the approximate capacity of the line to La Jolla—by addition of further compressor capacity at Huntington Beach. A line from Seal Beach to supplement the supply for the San Diego carrier is being considered, to be laid when necessary to increase the line capacity. Cost of this additional line, together with increased compressor capacity at Huntington Beach, would be in the neighborhood of $175,000.

While no decision has been arrived at, it is thought that straight natural gas service may be instituted in San Diego, where oil gas is now being distributed.

Negotiations between the San Diego Consolidated and the Southern Counties being still in progress, the Commission hearing was continued to October 30.

1929-1930 Calendar

International Petroleum Exposition and Congress — Tulsa, Oklahoma, October 5-12, 1929.

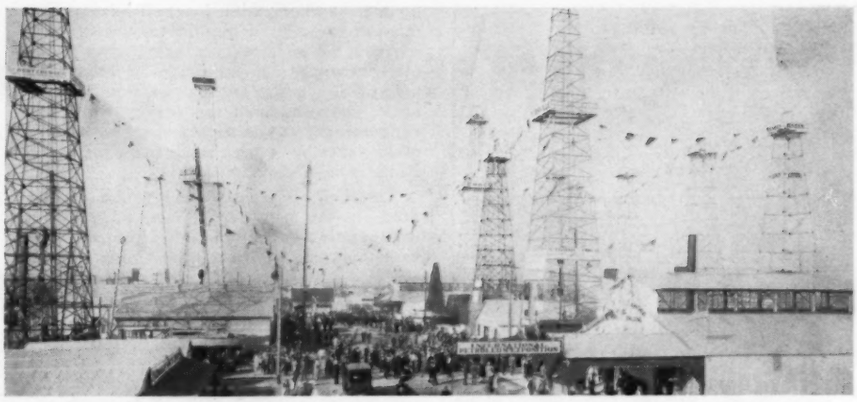
American Society of Mechanical Engineers, National Fuel Meeting—Philadelphia, October 7-10, 1929.

American Gas Association, 11th Annual Convention—Atlantic City, October 14-19, 1929.

Southern California Meter Association—October 24, 1929.

Utilities Association Secretaries of the United States—Chicago, December, 1929.

Arizona Utilities Association, Pacific Coast Gas Associtaion—Joint conference, Arizona Biltmore, near Phoenix, April, 1930.



Main thoroughfare, Petroleum Exposition grounds at Tulsa, Oklahoma.

Sixth Petroleum Congress, Oct. 5-12

AS the October 5-12 dates for the Sixth International Petroleum Exposition and Congress draw near Exposition committees, headed by General Manager, William B. Way, are winding up details of arrangements which will make this year's exhibition at Tulsa stand out as a memorable one. Attendance is expected to exceed last year's record of 106,000.

Several organizations are holding meetings during the two pre-Exposition dates, October 3 and 4, including several committees of the A. P. I. and American Institute of Mining and Metallurgical Engineers. During the Exposition dates numerous meetings of national importance will transpire, among them those of the American Association of State Geologists on October 8. Pioneers of the Oil Industry on October 9, (at which an organization charter will be drawn up), the Mid-Continent Oil and Gas Association banquet on the night of October 9, the Independent Producers Association on October 10, and others for which definite dates are yet to be set.

Exposition gates officially open at 10 a. m., October 5. The "On to Tulsa" airplane derby closes on this day, the finish line being over the Exposition grounds.

A feature of this year's Exposition will be a number of safety contests conducted under the auspices of the Mid-Continent Oil and Gas Association's Safety Division and the National Safety Council.

An important welding program, arranged by the American Welding Society will be conducted on the morning of October 11, with welding contests to be staged in the afternoon.

Educational features at this year's exposition cover a wide range and will represent a valuable contribution to oil and gas industry development. In addition to the sessions of various organizations, at which important papers will be read, other educational innovations are arranged for. Dr. O. M. Smith, Oklahoma A. & M. College, chemistry department head, will conduct a lecture course for students, and the large new auditorium building will constitute as an amplified classroom for experienced scientists, field and plant superintendents, and college students. Corrosion problems of the oil and gas industry will come in for extended discussion during exposition dates.

The high point in educational values at the exposition will be found in the exhibits themselves, which will cover two lineal miles and include in their variety every new and improved product serving the oil and gas industry. Among the exhibits will be that of the United States Bureau of Mines on products of natural gas. The Bureau will also present laboratory demonstrations covering safety procedure and its exhibit will contain many forms of test apparatus. Geological displays will be presented by several states, among them Oklahoma, Louisiana, Texas, Kentucky, New Mexico and Kansas. Estimated value of the combined exhibits to be displayed at the Exposition ranges from $8,500,000 to $10,000,000.

Speakers of national note will address many of the organizations holding meetings at Tulsa. Roger Babson will speak at the Chamber of Commerce Exposition luncheon. Homer S. Fox, United States Board of Trade representative at London, England, will speak at the Mid-Continent Oil and Gas Association banquet.

President William G. Skelly, together with the Exposition staff and the many committees which have cooperated to produce this year's Congress, anticipate that their efforts will be repaid in the most successful Exposition to date.

SO. CAL. GAS CO. HAS CLASS IN GAS MANUFACTURE

Employees of the Southern California Gas Company to the number of 30 are supporting a class in the manufacture, distribution, utilization and sale of gas, under the leadership of Sydney W. Binckley, a member of the rate and appraisal department of the company. Mr. Binckley is giving a resume of the lectures which were given during a two-year course at Columbia on the same subject, and is using an outline of this course as a basis for his talks. He is also drawing from his own experience as a chemical and civil engineer in presenting points of interest on the subject.

IVAN KNICKERBOCKER MANAGER OF GAS CO. AT ALTOONA, KAN.

Ivan Knickerbocker has been appointed as local manager for the Kansas Gas and Electric Company at Altoona, Kansas, according to a recent report.

Showing route of proposed pipeline for Coast Counties Gas and Elec. Co.

Coast Counties Natural Gas Plans Advance

FURTHER developments in the Coast Counties Gas and Electric Company's plans to bring gas to its northern California service area through its own pipe line were made during the past month. Following a ruling of the Railroad Commission early in September that Coast Counties territory should not be entered by other companies without specific order of the commission, the Coast Counties requested the Commission to dismiss its application entered in August, which contained a proviso concerning making transportation arrangements with other pipe line companies. Coast Counties then made direct application for authority to construct a pipe line varying from 18 to 20 inches in diameter from the Dudley Ridge and Kettleman Hills gas and oil fields in Fresno and Kings counties to Crockett in Contra Costa County, to bring natural gas to its northern division. Permission to construct a branch line from the main line, running from a point near Volta in Merced County to Watsonville, San Benito, Santa Cruz, Monterey and Santa Clara, the branch to be of 8-10 inch diameter and approximately 54 miles long, to serve its southern division, is also sought. The main line would be about 205 miles long and would bring gas to 22 major industries in the Contra Costa area as well as to domestic consumers. Among the industrial users are the plants of Columbia Steel Company, California Hawaiian Sugar Refining Company and others.

The line's construction, according to officials of the company, will begin immediately upon its authorization by the Railroad Commission, details of preliminary survey and securing of gas reserves being already well along towards completion. The engineering firm of Sanderson and Porter, San Francisco office, has conducted the survey work. Arrangements for gas supply covering a period of 15 years have been made with the Dudley Ridge Oil Company, Ltd.

The Coast Counties' line would be operated by the company direct, no plans for organization of a pipe line company being contemplated. Costs of the Coast Counties' natural gas project are estimated at $8,000,000.

Date for hearing the application has been set by the Commission for October 17 at San Francisco.

This Gas Utility Tells *the* Nation

(Continued from Page 45)

financial structure of the company's organization and is illustrated with scenes of the company's major properties. Maps of the gas and electric transmission lines are included, as are statistical data telling of the company's facilities to serve.

Through this contact, the story that natural gas is available in the San Francisco metropolitan Bay Area and the name of our firm through the delivery of the booklet, have become established in the eastern executive's mind and should he think of coming West, we believe he will confer with us in the matter and seek advice regarding this field, through our offices—particularly since we are an independent concern with nothing to sell but service.

We are also urging those who might be in any way interested, to avail themselves of the cooperation of our industrial engineers who will be placed at their service. Individual problems will be answered by confidential reports, which will be mailed to inquiring executives.

The industrial gas sales department, due to the bringing in of this natural gas, has been increased in personnel and importance through the necessity of selling a greater quantity of industrial gas. There will now be available for industries, straight natural gas at a much reduced cost.

In each of the company's divisions where the straight natural gas will be available for industrial purposes, sales engineers are specialists in the sale and further utilization of this product. These men devote their time exclusively to the upbuilding of industrial load. This corps includes specialists in the various lines such as heat treating, etc.

We quite naturally realize that any company endeavor of this sort parallels and in a measure duplicates the work of the chambers of commerce, service clubs and other civic organizations, and it is our plan to cooperate as closely with all of them as is possible. A special broadside outlining the campaign was prepared and sent to all civic, commercial and industrial organizations as well as to each of the newspapers throughout the territory.

The history of the satisfactory growth of the Pacific Gas and Electric Company has been in a large measure the history of the growth of northern California. To the extent that this campaign and similar and more widespread activities may accelerate this territory's industrial expansion, our company may justifiably expect to share in the resulting prosperity.

The entire campaign was originated by and is being conducted under the direction of J. Charles Jordan, head of our advertising and publicity department. Already we have received many inquiries for the booklet and it is interesting to observe that responses were received here on the Pacific Coast from Atlantic Seaboard inquirers even before the publicity itself had reached the Western readers.

Northern Oil *and* Gas Assn's. Meet Sept. 19-21

ON SEPTEMBER 19, 20 and 21 the Rocky Mountain Oil & Gas Association, Montana Chapter, met in joint session with the Alberta Oil and Gas Association at Calgary, Alberta. Walter F. Brittan, secretary of the Montana group, reports an enthusiastic meeting attended by approximately 700 oil and gas men from all parts of the Dominion of Canada and several states.

Walter F. Brittan

LINE TO WINNIPEG

One important development at the meeting was the announcement of W. H. Herron, president of the Alberta association, that he is perfecting plans for a gas pipe line from the Turner Valley, Alberta fields, to Winnipeg, a distance of 750 miles, the line to be laid at a cost of approximately $50,000,000. According to Mr. Herron, some 500,000,000 cubic feet of gas is now being blown to the air at Turner Valley.

Delegates to the Calgary meeting registered beginning 9 a. m. Thursday, September 19, heard an address of welcome by Mayor F. E. Osborne at 10:30, and at 11:30 left on a trip of inspection of the Turner Valley oil and gas fields.

Sessions on Friday, September 20, opening at 10 a. m., included the president's address by W. H. Herron and addresses of Theodore Link, Imperial Oil geologist; Premiere Donne Brownled; Donald Campbell, president the Rocky Mountain Oil & Gas Association, Montana Chapter; J. E. Erickson, Governor of Montana, and W. M. Fulton.

Saturday morning, September 21, was given over to another business session with addresses by Clarence Moore, president of the Imperial Refinery at Calgary; and W. W. Gail of Billings, Montana. Saturday afternoon was devoted to a golf tournament and a baseball match between Montana and Calgary representatives. A cabaret banquet and dance featured Saturday evening.

ARKANSAS NATURAL ASKS FOR MONTICELLO PERMIT

The Arkansas Natural Gas Corporation has asked the city of Monticello, Ark., for a franchise for the service of natural gas to that town.

Payne unit furnaces heat homes of five or fifty rooms with equal comfort, ease of control, luxury and economy...

A book of typical residential floor plans, heating specifications and full description of Payne Unit Gas Furnaces will be sent promptly on request. Ask for Bulletins 2a and 3a, giving names of your Architect and Building Contractor.

PAYNE FURNACE & SUPPLY CO., INC.

BEVERLY HILLS, CALIFORNIA

Payne Heat

Unit Furnaces
Floor Furnaces
Central Furnaces
Industrial Installations
Pipeless Wall Units
Factory Units

Payne Engineering Service

Architects, Building Contractors and Heating Engineers are invited to put their troublesome warm air heating problems up to Payne Engineers. Send floor plans and full details of heating requirements. No matter how large or how small your installation may be, the Payne Furnace & Supply Co., Inc., is ready to cooperate with you.

Payne

THERE IS A "PAYNE HEAT" SYSTEM FOR EVERY BUILDING AND CLIMATE

36th Convention Sums *up* Year *of* Progress *on* Coast

(Continued from Page 37)

Outstanding also among the four playlets was the motion picture—*"Gas Is Better"*—"written, enacted and produced" by employees of the San Diego Consolidated Gas and Electric Company, under the direction of Ray C. Cavell. This film was actually flashed on the silver sheet to the edification of all present and it attested in a very striking way the efficient use which San Diego gas men are making of the modern motion picture. It featured gas for house-heating as contrasted to competitive fuels.

"The Trial of Gas" was a playlet coming from the pen of A. C. Miller and presented by Pacific Gas and Electric Company employees. Against a courtroom background there transpired a divorce action—a modern housewife, plaintiff (on grounds of failure to provide modern gas appliances), a husband who held obsolete notions on household conveniences, defendant. The hoped-for happy ending materialized in dismissal of the divorce suit when the husband saw the error of his ways.

An up-to-the-minute presentation of approved complaint adjustment practice, combined with convincing salesmanship of the advantages of gas, was evident in *"Natural Gab"*, a one-act comedy written and enacted by employees of the Southern California Gas Company.

Although it lay outside the convention theatrical program a playlet which vied with the best of the Public Relations Section stunts in entertainment value, though it was presented with a purpose entirely serious, was that staged by the Commercial Rate Committee of which L. F. Galbraith, Pacific Gas and Electric Company, was chairman. "The Rate Complex—a Playlet," will appear in an early number of *Western Gas*.

Convention Oratory

This year separate three-minute speaking contests were conducted for men and women, the women's contest featuring the Wednesday luncheon program.

A beautiful wrist watch was the Association's award to Clarita S. Hinde, Los Angeles Gas and Electric Corporation, winner of first place. E. L. Mathy of the Victor Welding Equipment Company made an additional gift of $25 in cash. Miss Mark Kinerk won second place and received a desk pen set also offered by the Association.

Victory in the men's three-minute contest, held at the Thursday luncheon program went to Norman L. Hoff, Los Angeles Gas and Electric Corporation, and second place to Stanley Beethan, Portland Gas and Coke Company, the awards being a wrist watch and a pen desk set, respectively.

A decidedly new wrinkle in convention entertainment was a series of burlesque water events carried through on Thursday afternoon in the Hotel Del Monte's outdoor Roman Plunge. Expert diving, canoe tilts, and other individual events climaxed in a water polo fray between representatives of northern and southern Association territory, using a ball several times oversize, a pair of convenient ash cans serving as goals. A draw was declared when contestants had reached the point of imminent exhaustion.

Golf

One side of convention activity which at Del Monte was set in unusually favorable surroundings was that of the annual golf tournament, played on Thursday afternoon, with the four match flights being run off Friday. Results of convention golf may be summarized as follows:

Winner low gross—F. T. Parks, Public Service Company of Colorado, Denver, Colorado—score 83.

Low net and first flight in the match play—George H. Finley—low net carrying with it the Babcock-Basford-Pedersen cup. Runner-up, first flight—H. B. Heryford.

Second flight—L. F. Galbraith; runner-up, I. B. Adams

Third flight—B. S. Pedersen; runner-up, J. H. Gumz.

Fourth flight—A. C. Bartley; runner-up, Graham Hambly.

Low gross in the women's golf went to Mrs. Wm. Moeller, Jr., Los Angeles, and low net to Mrs. F. H. Bivens, also of Los Angeles.

In their usual generous fashion several of the Association's Class "B" members provided an abundant selection of golf prizes for convention winners.

Many worthwhile convention features which have not come in for discussion in the foregoing paragraphs must be dismissed with a word—among them the excellent array of utility advertising prepared by advertising committees for inspection of the convention—and the many noteworthy addresses and discussions which combined to make this year's Sectional programs outstanding in Association annals. After all, the worthwhile things of a convention come from attending the sessions—not from reading about them.

We can think of no better sentiment with which to close this brief summary of the 36th annual convention than that expressed by retiring president Charles H. Dickey in his call to the convention. Said Mr. Dickey—

"The Association is the catalyst in the reaction which results in singleness of purpose and concerted effort, and its conventions are the crucibles in which uncertainty and indifference are converted to determination and enthusiasm."

Refueling *the* Graf Zepplin *with* Natural Gas

(Continued from Page 44)

to the foot of the mooring mast where an 8-inch screw valve was installed. A short riser was inserted at the discharge of the gate valve near the foot of the mooring mast, for making connections with a flexible canvas pipe which ran up parallel to the mast, into the nose of the bag, and through to the fuel gas storage ballonett. The gas was admitted into the bag at approximately 2 inches water pressure.

At the extreme end of the 8-inch fuel line a flange was installed wherein a paper safety plug was inserted. This plug would have blown out at about one-half pound pressure.

To control the quantity of flow and the quality of gas it was necessary to maintain constant telephone communications between the officer in charge within the bag, the man at the control valve at the foot of the mast, and the operator located at the mixing meters. Gravities were taken at the foot of the mast approximately every 7 to 10 minutes, using a Schillings Bottle operated by the effusion method, and the exact gravity thus determined was telephoned to the man operating the mixing meters. In addition, figures and charts showing approximate differential and static pressures to be carried in producing the desired mixture served to guide the operator at the mixing meters.

A total of 67 specific gravity tests were run on the fuel gas in the 12 hours of fueling.

Though the gas was at times delivered as rapidly as 40,000 cubic feet hourly, the average rate of flow was approximately 15,000 cubic feet per hour, the ship taking on a total of about 180,000 cubic feet.

An ingenious device making up part of the Graf's carburetor equipment enables the ship to switch from gaseous to liquid fuel instantly. Gasoline powers the motors during starting, for rising over high elevations, and for emergency use.

Certain practices decided upon in advance of the refueling operations were necessarily modified as the work progressed, due to a limitation of working time and to other factors. In the light of experience gained in the Mines Field refueling the engineers conducting the work feel that it will be possible in subsequent refueling to make the task entirely automatic. J. O. Wiley of Westcott & Greis, Inc., suggests the following procedure for making the refueling automatic:

"Install a rate volume control instrument on each meter run of the mixing manifold and a temperature regulator on the steam supply line. Use reducing regulators to maintain a constant pressure to each meter and recording thermometers on each meter to record any variation in temperature. Thus with all conditions held constant no variation in the propane product's gravity would exist and the proper ratios could be maintained on the mixture at all times."

Utilizing gas in internal combustion motors is a time-proven practice and its economies and advantages are recognized on every hand, as seen in its application for breaking in new automobile motors, powering motors for pumping service, providing engine power for well drilling, and the like. However, as power fuel for dirigible propulsion gas finds a new outlet, unique and limited at present, its future depending entirely upon the growth of this branch of modern aviation. Gas men the world over will eye the development of this "industrial consumer" with more than passing interest.

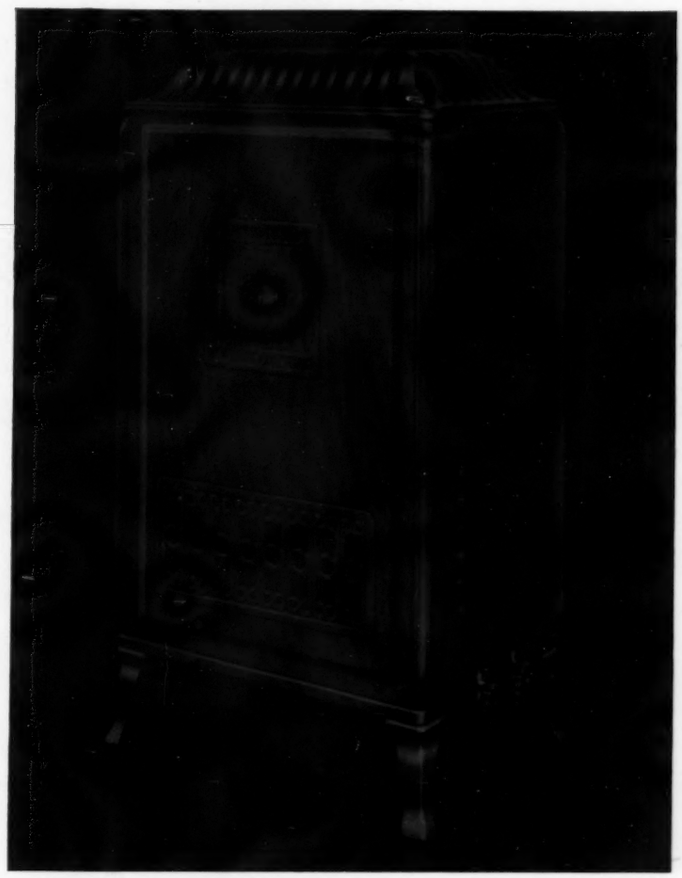
BOULDER AND JOHNSTON, COLO., TO RECEIVE NATURAL SERVICE

It is expected that natural gas will be delivered in Boulder and Johnston, Colorado, by the first of October, according to an announcement by the Colorado-Wyoming Gas Company, holder of the franchise.

CLINT AND FABENS TO BE SERVED BY LEA COUNTY LINE

H. G. Frost, vice-president and general manager of the El Paso Natural Gas Company, has announced the construction of a gas line connecting with its Lea County gas field El Paso line, at a point near Clint, which wil serve Clint and Fabens. The line will be constructed at a cost of approximately $150,000.

The market is wide open for this great load-builder



Selling Points!

Easy-to-clean, vitreous enameled cabinet.

Double air-circulating system—built around the famous Intensi-Fire Air Duct.

New-type double burners.

Vapor tank.

Manual or thermostatic control.

Fume-tight, gas-tight, absolutely safe.

OVER five hundred gas companies are giving their heating load an upward boost this Fall with active campaigns on the Estate Gas Heatrola. And they are getting results! For the Heatrola does a fine heating job with the perfect fuel they sell.

You can count on the same success in your community, for there are thousands of half-heated homes, stores and apartments—waiting for the clean, healthful, *circulating* warmth of the Gas Heatrola.

There is still time to get some Heatrolas planted in your territory, so that next Fall you can count on a rich harvest of sales and a greatly increased heating load. There's no obligation, of course, in asking an Estate representative to call on you at once. Or, if you wish, we will mail you full information about the Heatrola line.

THE ESTATE STOVE COMPANY, HAMILTON, OHIO

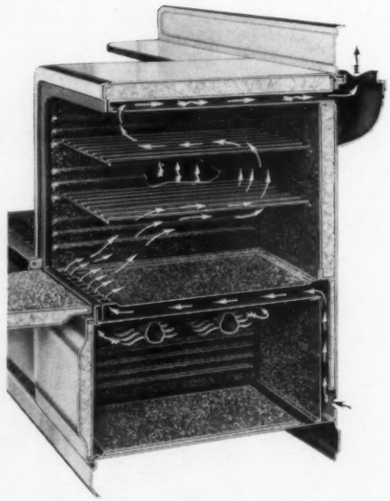
House Founded in 1845

Estate GAS HEATROLA

There is only *One* Heatrola...*Estate* builds it

375° in the oven!
72° in the kitchen!

Another dramatic selling point for the great Estate oven



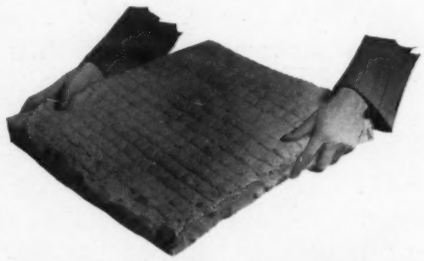
The arrows show how Estate engineers effected a perfect insulation without interfering with the distinctive fresh-air oven construction. The straight arrows trace the fresh air from its entrance into the double oven bottom to its exit through the flue. The feathered arrows show the course of the products of combustion.

A RANGE is as good as its oven! And in the Estate you have always had a distinctive and dramatic oven to talk about. But now that this famous Fresh-Air Oven is INSULATED, Estate offers you a more dramatic selling point than ever before.

375° in the oven—and the "hotness" stays there. 72° in the kitchen—and it stays that way—cooler, more comfortable. At last an insulated oven that really retains its heat. Quicker, better baking and a real saving of fuel. No wonder women are so enthusiastic about this new Estate.

The insulation itself is a thick blanket of rock wool. And so ingeniously has it been built into the oven and broiler section that it in no way interferes with the distinctive fresh-air circulation that has sold so many Estate ranges.

May we send you our new catalog, No. 71, with full information about the complete Estate line?



Rock wool—found by exhaustive laboratory tests to be the most efficient insulator obtainable for gas oven temperatures. Absolutely fire-proof, sanitary, indestructible. Wired and packed in units that cannot mat or settle.

THE ESTATE STOVE COMPANY, HAMILTON, OHIO · *House Founded in 1845*

Estate GAS RANGES

with the "double boiler" oven that bakes with *fresh air*

Accounting Committee Meets *in* Dallas

THE Southwest Committee of the Natural Gas Department of the American Gas Association on Uniform Classification of Accounts met in the Lone Star Gas Company offices at Dallas, Texas, on August 23.

Those attending the committee meeting were E. N. Watkins, of the Arkansas Natural Gas Corporation of Shreveport, chairman; L. L. Dyer, Lone Star Gas Company; J. R. Abercrombie, Gas Service Corporation, Kansas City, and W. C. Grant, Lone Star Gas Company and secretary of the Southwest Division of the Natural Gas Department.

Following a discussion of the classifications of accounts in force in a number of states, it was decided that the work of determining classifications should be divided between the membership of the committee, with each committeeman being assigned a classification with which he was particularly familiar. It was agreed that Mr. Watkins, chairman, should assign the work to the various men.

It was also decided that the classifications should be discussed from the standpoint of individual accounts, such as investment accounts, expense and earning accounts, distribution accounts, et cetera. Each member of the committee was asked to bring in recommendations for the classifications for one or more of these accounts.

W. F. Hartwig of the Louisiana Gas and Fuel Company of Shreveport, sent in his resignation to the committee, stating that due to a change of positions, he would be no longer eligible for the work. It was suggested that Mr. Watkins appoint another member to the committee replacing Mr. Hartwig.

There is some likelihood that the next meeting of the committee will be held in October at Atlantic City during the American Gas Association Convention.

PORTLAND GAS AND COKE CO. IN CONSTRUCTION PROGRAM

CONSTRUCTION of the new high-pressure distribution line from the Portland system to Salem, Oregon, and cities enroute, by the Portland Gas and Coke Company began late in August, following the purchase by the company of the Portland Electric Power Company's plant at Salem.

A 10-inch main will be laid on the Boones Ferry Road from Taylors Ferry south to Tualatin. An 8-inch main will extend from that point to Wilsonville, crossing the Willamette River on the Oregon Electric Railway Company's bridge, and continuing south to an intersection with the Pacific Highway to Salem. The main line will pass through Aurora, Woodburn, Hubbard and Chemawa, and will be in close proximity to Gervais and Brooks.

Plans are under way for a 4-inch high pressure belt line to surround the present low pressure system in Salem. District governors are to be placed at points along the line between the high pressure and low pressure systems.

Total cost of the extension is estimated at $720,000 with a total of 5,000 new consumers to be served.

A portion of the Capitol Theater Building in Salem has been leased by the company for offices, and has been refinished along modernistic lines.

A story on the new gas development in the Willamette Valley covering transmission and distribution details will appear in the November issue of *Western Gas.*

CENTRAL STATES P. & L. BUYS WESTERN COUNTIES GAS CO.

Central States Power & Light Co., an Insull property, has purchased, according to announcement, the Western Counties Gas Company, which supplies gas to Clinton, Cordell, Hobart and other Oklahoma towns from the Sayre field in Beckham county. The Central States owns gas franchises in Elk City, Erick and other western Oklahoma towns.

C. H. DICKEY LEAVES WEST COAST ON TOUR OF EUROPE

C. H. Dickey, 1928-1929 president of the Pacific Coast Gas Association, following the annual convention of that organization at Del Monte, Calif., left Tuesday, September 17, on a tour of several months duration which will take him to principal points in Europe.

NATIONAL SAFETY COUNCIL IN 18TH ANNUAL CONGRESS

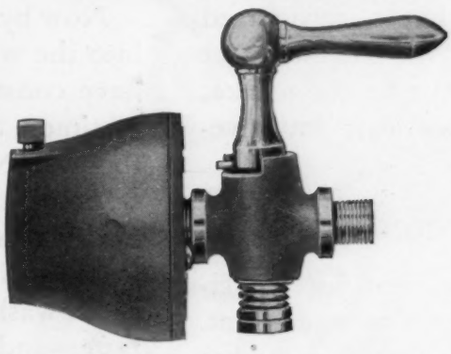
The National Safety Council, with headquarters in Chicago, Illinois, is holding its 18th Annual Safety Congress at Chicago, September 30 to August 4. There will be 125 sessions, participated in by 41 sections.

The program for the Public Utilities Section is under the direction of B. B. McCulloch of the Bureau of Safety of Chicago, the program representing the progress of accident prevention work in the public utilities during the past year.

A. D. MAC LEAN ON VISIT TO PACIFIC COAST IN SEPT.

A. D. MacLean, chief engineer for the Pittsburgh Equitable Meter Company of Pittsburgh, Pennsylvania, made a trip to the Pacific Coast in September.

JOHNSON
Gas Stove
COCKS and VALVES



Fitted with Johnson Patented Direct Jet Regulators, these important accessories insure economical and efficient gas stove service. Gas stoves thus equipped, result in that user satisfaction which builds goodwill. The Johnson Regulator directs a solid jet of gas directly down the center of the mixing tube under maximum jet velocity. This produces perfect combustion and a clear, blue flame of high temperature is the result. Johnson gas mixers and valves are made for any size drilled pipe Burner.

Write for full details.

JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA

Pacific Coast Representative: C. B. Babcock Co.,
135 Bluxome Street, San Francisco

The Coast Counties Gas and Electric Company is following a new thought in its advertising and publicity. Billboards and newspaper copy all strive to point out, not the excellence of the gas company, but the remarkable development that is going on in the territory that it serves. Judicious praise of the other man is one of the surest ways to win his esteem. We anticipate a sound and favorable public esteem being built up by this intelligent endeavor.

C. B. BABCOCK CO.
San Francisco Los Angeles

Presenting the Thor Agitator

with built-in gas heater

THE famous Thor Agitator—recognized and approved to be the fastest, most thorough washer of its type on the market—now offers still another vast improvement in design.

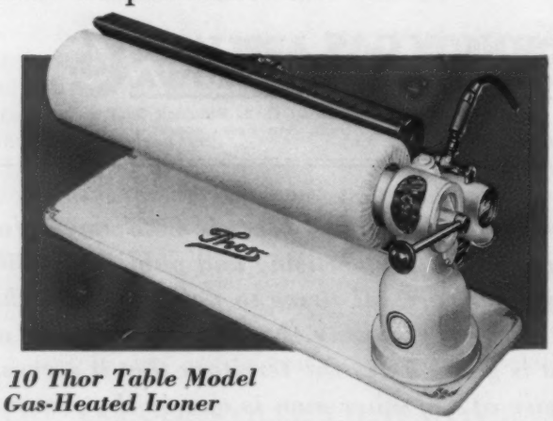
A built-in gas water heater

Fast before—it is now even faster. Efficient before—it becomes still more efficient. Everyone knows that fast, thorough clothes washing in any type washer depends *first* on water temperature.

Now by designing an efficient gas burner into the washer we've made it possible to have constantly heated water in the tub at all times. Simply fill the tub once and light the gas. No cooling off. No adding hot water. No draining off cooled water and changing to hot. The water remains at the same efficient temperature throughout the entire wash. Clothes are thoroughly cleaned faster—and the whole washing operation is speeded up as a result.

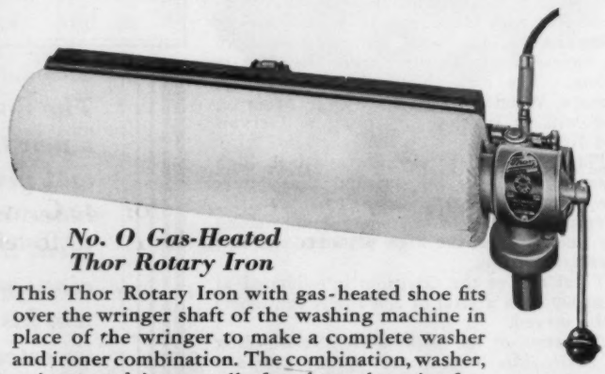
NOW—all drudgery gone

This removes the last trace of drudgery from the wash-day task—the business of fill-



No. 10 Thor Table Model Gas-Heated Ironer

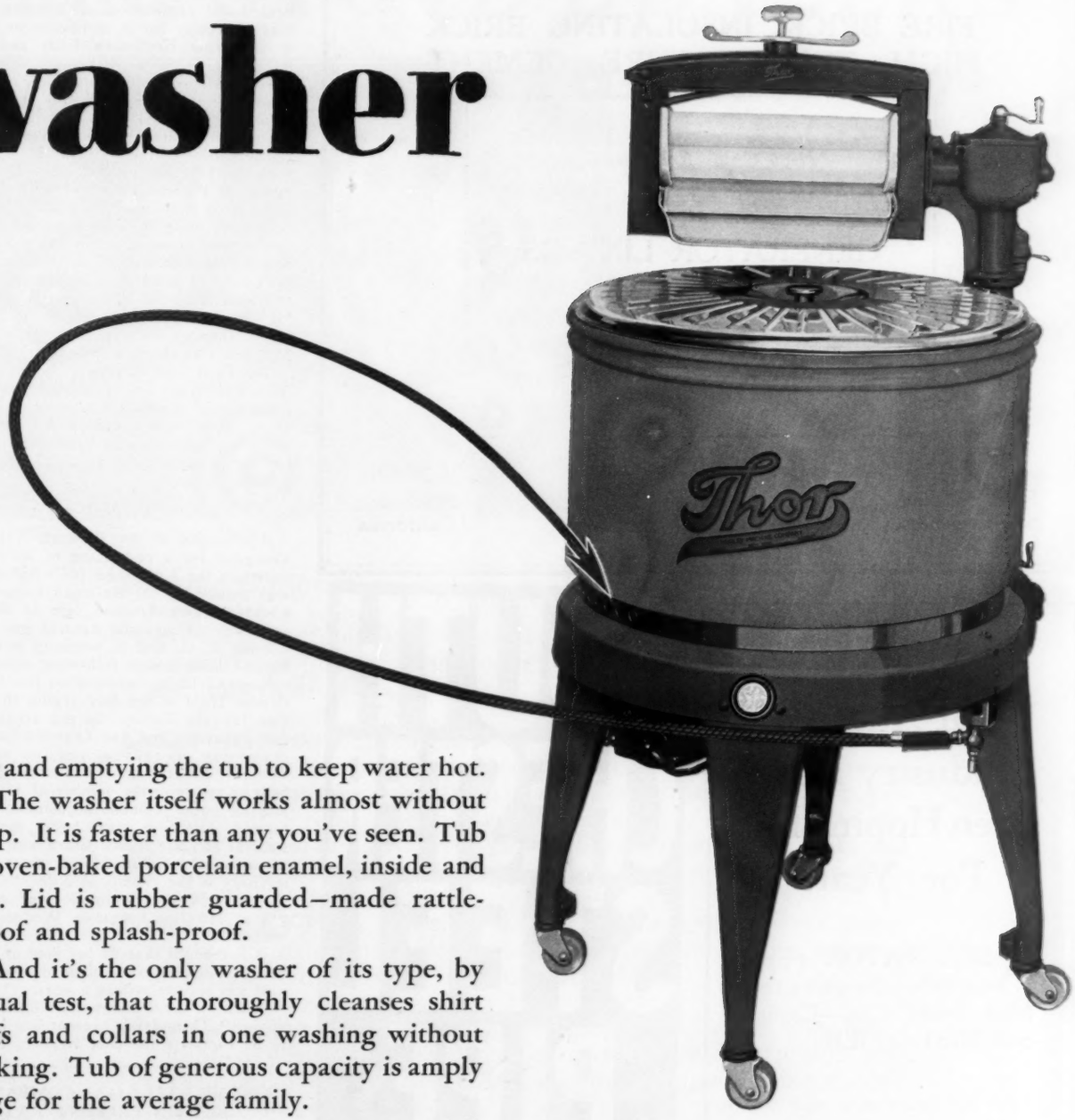
This is the portable Thor Rotary Iron with gas-heated shoe that can be used on any convenient table. Has ironing surface of 10 flat-irons. With 10 minutes practice anyone can operate it. It irons everything—75% faster than hand-ironing. Presses men's trousers and women's skirts.



No. O Gas-Heated Thor Rotary Iron

This Thor Rotary Iron with gas-heated shoe fits over the wringer shaft of the washing machine in place of the wringer to make a complete washer and ironer combination. The combination, washer, wringer and ironer sells for about the price formerly asked for a good washer alone.

famous washer



ing and emptying the tub to keep water hot.

The washer itself works almost without help. It is faster than any you've seen. Tub is oven-baked porcelain enamel, inside and out. Lid is rubber guarded—made rattle-proof and splash-proof.

And it's the only washer of its type, by actual test, that thoroughly cleanses shirt cuffs and collars in one washing without soaking. Tub of generous capacity is amply large for the average family.

Gas Companies! The Thor Agitator, the Combination Washer and Ironer and the Table Model Ironer illustrated here have been the sensation of the industry in the past year. Equipped for gas heating—these famous appliances open new fields for aggressive sales development. Write us for territory allotment and franchise information.

HURLEY MACHINE COMPANY

Dept. K-10, 22nd Street and 54th Avenue

Chicago Illinois

K-10

OF WASHING AND IRONING MACHINES

Stockton Fire Brick Company

FIRE BRICK, INSULATING BRICK
HIGH TEMPERATURE CEMENT

High Grade Refractories
for

GENERATOR LININGS
CHECKERS
BOILER SETTINGS

OFFICE:
Russ Building,
San Francisco

WORKS:
Stockton,
California

What the Gas Industry Has Been Hoping for For Years

A SEPARATOR that actually Separates Mist from Gas—Campbell MIST-D-FIER.

For full information send for Bulletin No. 6

J. A. CAMPBELL CO.
Natural Gas Engineers
P. O. Drawer 669
Long Beach, California

SOUTH CHESTER STEEL PIPE

Excels for Gas Service

The unusual care given to accuracy of diameter and welding qualities, makes Chester Pipe a favorite for gas lines.

SOUTH CHESTER TUBE CO.
Chester, Pa.

P. G. *and* E. Gets Permit *to* Lay *2nd* Main Line

THE California Railroad Commission in two decisions issued September 3 granted the Pacific Gas and Electric Company a certificate of public convenience and necessity to lay a 20-inch natural gas line from Pinoche Pass in Fresno County to Richmond in Contra Costa County; and denied the application of Western Natural Gas Company for a certificate to construct a line from Kettleman Hills and Dudley Ridge oil fields to Richmond with branch lines to Modesto, Stockton, Lodi, and Sacramento. The P. G. and E. line authorized in the September 3 decision will supplement the supply obtained from the company's Buttonwillow-Milpitas line. It will tie in with the first line, which is of 22-inch diameter, at Pinoche Pass and will extend 162 miles with a delivery capacity of 60 million cubic feet daily without compression, which figure can be increased to 125 million cubic feet by installation of compressor stations.

From Richmond a 20-inch connecting line will extend to the P. G. and E. gas station "B" in Oakland to augment the East Bay supply through connection with the Oakland-Milpitas transmission system.

The P. G. and E. also plans to lay a 12½-inch line from its main line near Crow's Landing in Stanislaus County to Modesto, about 50 miles in length, and from Modesto north to Stockton and Sacramento, the line to have a capacity of about 15 million cubic feet daily.

STRAIGHT NATURAL GAS SERVICE

Application of the Western Natural Gas Company for a re-hearing of its petition to construct the Kettleman Hills-Richmond line was denied by the Railroad Commission in a three-to-two decision late in September.

Service of straight natural gas throughout the P. G. and E. territory is seen as a logical development following completion of the second main transmission line from Kettleman Hills to the Bay region through the San Joaquin Valley. In the areas south of San Francisco and San Leandro the work of converting its gas system to service of straight natural gas has already begun. Service crews to the number of 450 men are making house-to-house adjustment of appliances. The first areas being converted to natural gas are Santa Clara and peninsula towns south of San Mateo, as well as the territory in the vicinity of Niles, Newark and Decoto. Work of change-over to natural gas at San Jose began on Wednesday, September 25.

It is thought that 98 per cent of the P. G. and E.'s consumers will be on straight natural gas service within a year.

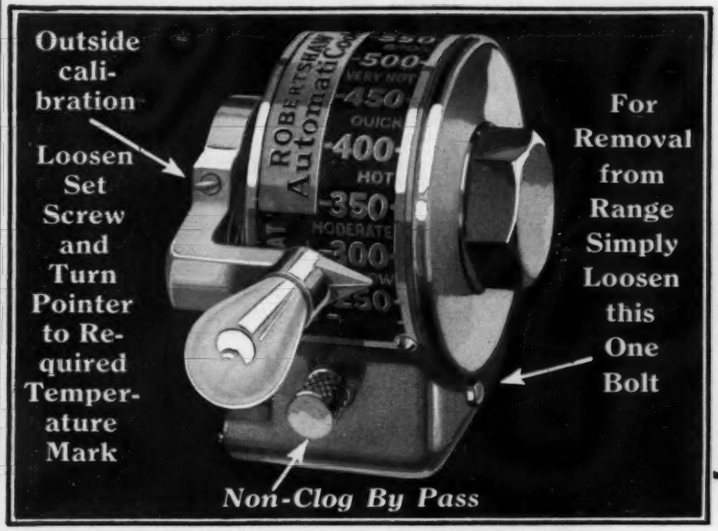
Work on the Buttonwillow-Kettleman link of the P. G. and E.'s present line is expected to be complete the first week in November.

GREAT FALLS GAS COMPANY TO RETAIN PRESENT RATES

In a decision handed down late in August in the United States District Court in Helena, Mont., the Great Falls Gas Company was given the right to retain its present schedule of rates for the service of gas.

An injunction suit was filed by the Great Falls Gas Company against the Montana Public Service Commission, asking that the Montana Court forbid the Commission to establish a new schedule of rates in the city of Great Falls. Granting of the injunction marked the end of 15 months of litigation between the company and the Commission.

GAS COMPANIES and STOVE DEALERS



Appreciate the Exclusive Advantages of the "B" Type

ROBERTSHAW AutomatiCook

TRADE MARK

Outside Calibration. Takes just a few seconds to change the temperature setting if required, by means of a convenient set-screw on the temperature pointer. Merely loosen the set-screw, move the pointer to the proper temperature mark on the dial, and then tighten the set-screw.

Quick Removal. Should the "B" Type AutomatiCook become damaged for any reason, necessitating replacement, it can be removed without disconnecting the range or disturbing the linings or the piping. Requires no mechanical servicing or repairs on the job. Simply loosen one bolt, replace the Thermostat with a spare and tighten the bolt. The job can be done in less than a minute's time.

Non Clog By-Pass Pilot. Will not clog nor bind. Always moves freely and maintains its adjustment. Eliminates servicing, adjusted by turning either to the right or left.

Non-Corrosive Valve Seat. The AutomatiCook is now being equipped with a Raised Non-Corrosive Valve Seat which will resist the corrosive action of gas, eliminating any possible trouble from this source.

Write for 8-Page Folder, illustrating and describing the above advantageous features.

ROBERTSHAW THERMOSTAT CO.

Youngwood, Penna.

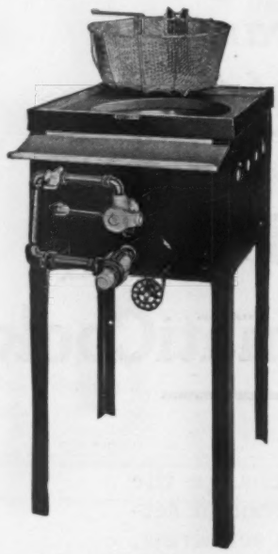
The Robertshaw AutomatiCook is now used on more than 80 leading makes of Gas Ranges

See This

Institutional Gas Load Builder

In Operation

Booth 161—A.G.A. Convention, Atlantic City



The Original PITMAN ECONOMY FRYER

For all Deep Fat Frying

in Restaurants, Hotels and Institutions

Selling Points

(1) Thermostat control—eliminates fire hazards.

(2) Removable Central Cone—Assures clean, "Golden Brown" products.

(3) Lower grease and gas operating cost.

(4) All frying now done in one container.

Over 3000 in Use

Literature and prices on request

H.G.W. YOUNG

67 Hanover St. Boston, Mass.

National Distributor

Exterior of Alhambra district office

Main lobby of the new Alhambra office

New Alhambra District Office

ON Saturday afternoon and evening, September 7, 'open house" was held at the handsome new office building of the Los Angeles Gas and Electric Corporation at 17 South First Street, Alhambra, Calif.

Manager Roy C. Gardner, of the Alhambra district of the utility, and his co-workers, together with other officials of the company were on hand to greet the visitors; and all who were in attendance at the "housewarming" were given an opportunity of inspecting the new offices from top to bottom.

R. C. Gardner
Alhambra Manager
L. A. G. and E.

Music for the occasion was furnished by the Corporation's own orchestra, made up entirely of employees.

The new office building represents an investment of approximately $160,000. It is about 85 feet by 54 feet in size, two stories in height, with basement and mezzanine floor. The main building is built of reinforced concrete and steel and is fireproof throughout. Italian Renaissance design is followed, the facade being of terra cotta surmounted with vari-colored brick in harmonizing shades.

The first floor contains the main lobby and business offices, manager's office, investigation room, ladies' rest room, vault and distribution department offices. The main lobby is a spacious room whose high ceiling is of beam and girder design, with pleasing floral decorations in pastel shades on the soffits and mould of the beams. In the northeast corner of the lobby is a huge fireplace with a handsome mantle of pedronyx and onyx inserts. The frontage on First Street is divided into large display windows, generously flood-lighted for the display of various household appliances.

Woodwork and doors on the first and mezzanine floors are of mahogany, as are the main public stairs leading to the second floor.

The second floor contains the main demonstration auditorium, employees' rest rooms, lunch room, addressograph and billing departments, collectors' quarters, employees' assembly room and locker rooms. The chief feature of this floor is the main auditorium which has been fitted up for cooking demonstrations and similar activities. At one end is a raised platform on which is a completely-equipped model tiled kitchen. This auditorium, with its equipment, will be used for cooking school and lecture purposes.

In the basement are housed the record vault, gas meter room, heating apparatus, electrical equipment, with the major portion so designed as to allow for automobile parking.

At the rear of the main building is a spacious yard which is surrounded by an attractive brick wall. Adjoining the main structure, along the south side of the yard, is an annex which is used for meter storage and other materials for gas service installation and a rest room and locker room for the service men. An auto shed flanks the south and west walls of the yard.

Some idea of the growth of the territory and the Corporation's business in it may be seen from the fact that it now has about 218 miles of gas mains compared with about 151 miles five years ago; and the number of meters in this district is now about 16,000, or an increase of nearly 6,500 in the same period. Gas consumption, too, has increased, jumping from 364,000,000 cubic feet in 1923 to over 730,000,000 cubic feet in 1928.

The Alhambra District Office of Los Angeles Gas and Electric Corportaion, since its inception, has been under the direction of Roy C. Gardner, who has spent nearly 25 years in the company's service. He came to Alhambra from the utility's Pasadena office where his last position was that of cashier with the virtual duties of assistant manager. Mr. Gardner has 16 people handling the office work under him, while a force of about 30 men, under the foremanship of J. J. McCrory, care for the gas distribution activities of the district.

CENTRAL STATES EDISON CO. TO SERVE ELGIN, KAN.

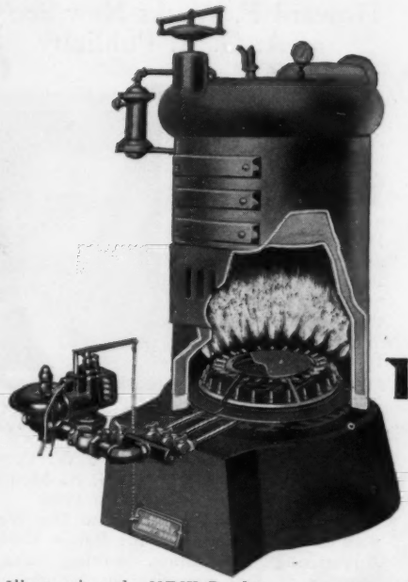
Central States Edison Company has purchased the gas distribution system in Elgin, Kansas, according to press reports. The company also owns the Sedan Gas Company of Kansas.

F. V. WILLIAMS NOW WITH COMMUNITY NATURAL

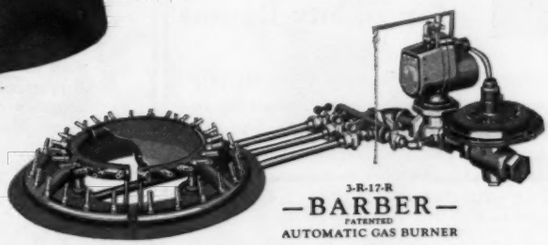
Frank V. Williams has announced his resignation as manager of the Municipal Gas Company of McKinney, Texas, to accept a position with the Community Natural Gas Company of Dallas.

NOW! MAKE REAL PROFITS THIS FALL —AND WINTER - - -

BARBER *Automatic* JET GAS BURNERS



Illustrating the NEW Barber Automatic Jet Burner (No. 3-R-17-R) installed in a round Boiler—through the clinker door opening—without removal of the grate bars.



The NEW Barber No. 3-R-17-R Automatic Jet Burner—made in FOUR standard sizes—for Grate Diameters from 16 to 31 inches inclusive—at astonishing low prices.

In THREE select models—Each made in FOUR sizes—To fit every pocket book—For all sizes of Round Furnaces and Boilers—whether for Warm Air—Steam—Hot Water or Vapor.

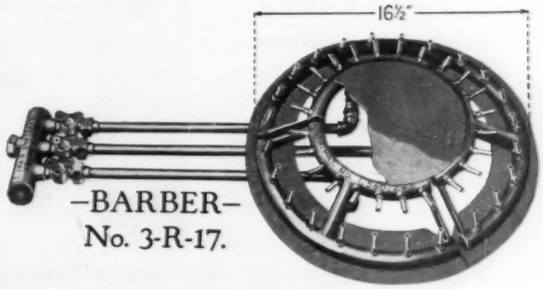
Your Customers Want Gas Heat—Why Not Give Them What They Want?

Every house heating plant in your community can easily be converted into a modern, gas-burning heater—and this profitable business can be obtained easily with Barber Automatic Jet Gas Burners. Remember—we co-operate with you in obtaining this business.

The New Barber No. 300-R Completely Automatic Jet Burner—with or without Safety Pilot Control—made in four standard sizes—for Grate Diameters from 16 to 31 inches inclusive.

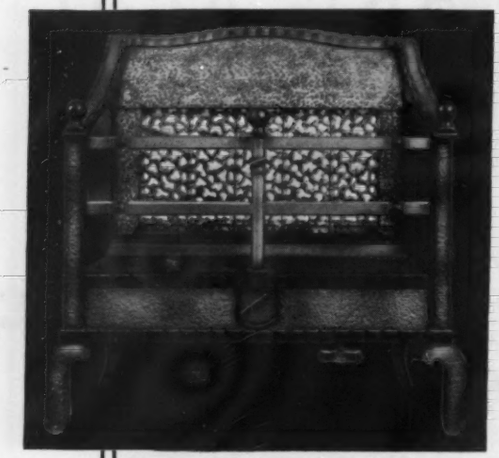
The present Furnace, Steam, Vapor or Hot Water Boiler is retained, the only change being in installation of the correct made-to-fit Barber Burner—for the particular boiler or furnace. Just write us telling the Trade Name, the Number and Manufacturer's Name of the Appliance, and we will quote you or ship at once the necessary Barber Burner Equipment to specifically suit the appliance.

Let your customers know you are equipped to make efficient gas heaters out of coal-burning boilers and furnaces—with Barber Patented Gas Burners. Do this right now! The Heating Season is here! You will find it a pleasant and profitable business.



The Improved Standard No. 3-R-17 Manually operated Barber Jet Burner—made in four standard sizes—for Grate Diameters from 16 to 31 inches inclusive.

The CLEVELAND GAS BURNER & APPLIANCE CO.
Burner Specialists
3702-04 Superior Avenue, Cleveland, Ohio



Model No. 10-44
"Castilian" Design
10 Elements

The Castilian

in the Cordeveaux finish

Spanish Grace for Dainty Rooms

Picture this "Castilian" model Guardian in a bright, cheery room where the furniture is light and graceful. Such harmony enhances the popularity of gas fireplace heaters.

Write for complete catalog—all heaters illustrated in full colors.

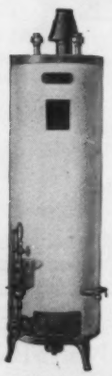
THE GUARDIAN GAS APPLIANCE CO.
1364 E. 47th St., Cleveland, Ohio

Guardian
FIREPLACE AND PORTABLE HEATERS

A Heater that Will Deliver a Gallon of Hot Water for Every *1 Foot of Natural Gas.*

THE heater is finished in lustrous enamel.

300-lb. test copper-bearing Steel tank.



New Efficient Insulating Material.

Safety Pilot.

Combination Safety and drain valve.

2 sizes: 25 gal.—40 gal.

Pittsburg Monarch Automatic Storage Water Heater

Made in 2 Sizes
25 Gallons—40 Gallons

Pittsburg Water Heater Company

Offices at:

478 Sutter St.
San Francisco

2010 Jackson St.
Dallas

242 So. Western Ave.
Los Angeles

Howard F. Weeks New Sec'y. *of* A. G. A. Publicity

Howard F. Weeks

ANNOUNCEment was made late in August by the headquarters of the American Gas Association of the appointment of Howard F. Weeks as secretary of the Publicity and Advertising Section of the Association.

Mr. Weeks was formerly assistant secretary of the Section, and has acted in the capacity of secretary since the resignation of Chas. W. Person. He is also editor of the A. G. A. Monthly, having held that position since 1926.

During the last annual session Mr. Weeks was elected treasurer of the Public Utilities Advertising Association, having been a member of that organization for the past three years.

DALLAS GAS CO. SPENDS $400,000 DURING SUMMER MONTHS

The Dallas Gas Company, distributor of natural gas at Dallas, Texas, has expended approximately $400,000 during the summer months for improvements to its distribution system. The majority of the appropriation went for extensions and replacements. Three hundred and fifty men were employed by the company in this construction program and 53,300 feet of gas line were laid. Henry L. Morris is president of the Dallas Gas Company and R. M. Redding is superintendent.

MAGNOLIA GAS CO. COMPLETES BRUNI-SAN ANTONIO LINE

The Magnolia Gas Company of Dallas, Texas, has announced the completion of its 235-mile gas line from the Bruni gas fields near Laredo to San Antonio and New Braunfels. Sixty miles of the line is of 20-inch pipe, 40 miles is of 18-inch, and the balance is 14-inch. Among some of the large industries which the line will serve are the San Antonio Public Service Company at San Antonio and New Braunfels and several large cement plants.

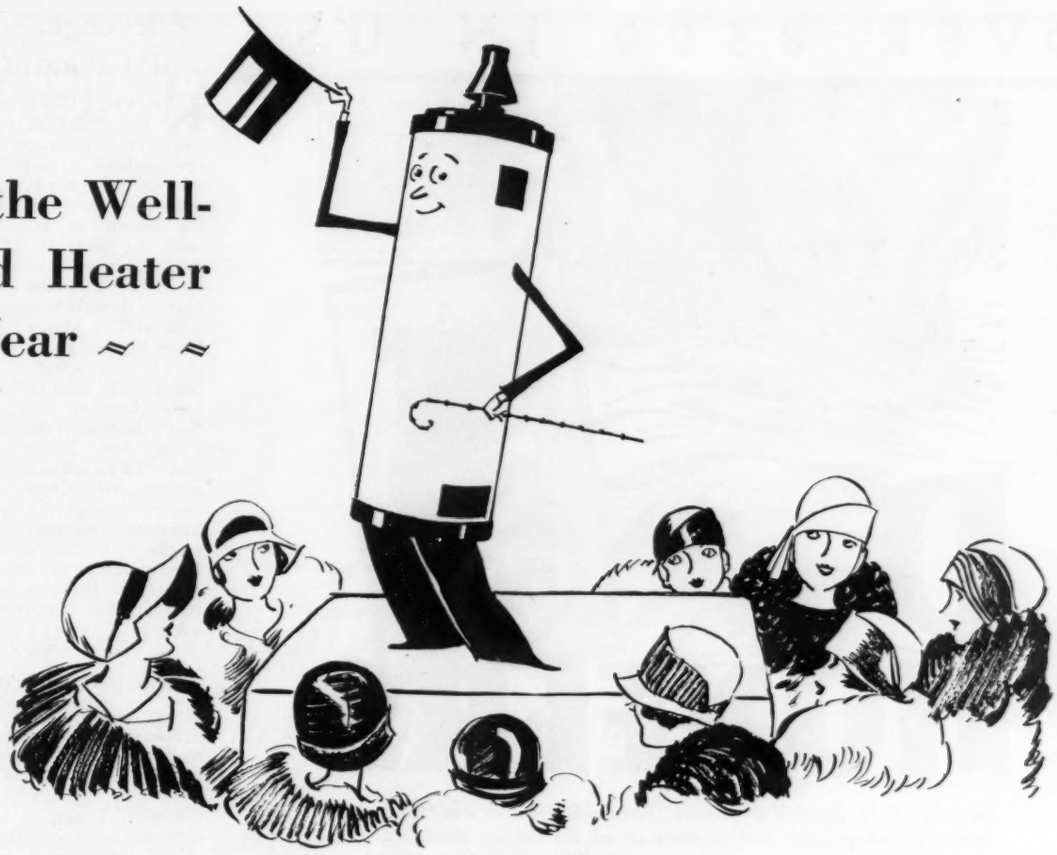
PERSONNEL CHANGES ANNOUNCED BY CAPITAL GAS & ELECTRIC CO.

C. L. Carr, formerly superintendent of the Capital Gas and Electric Company at Topeka, Kansas, has been named as superintendent of the St. Joseph Gas Company, of St. Joseph, Missouri, replacing H. H. Harrington, who has been given charge of the construction of distribution system in Monett, Missouri, and other cities in that section where gas franchises have been gained by the Gas Service Company.

PAUL EGAN NOW WITH HOUSTON NATURAL GAS CO.

Paul Egan, formerly of the engineering department of the Dallas Gas Company, is now associated with the engineering department of the Houston Natural Gas Company of Houston, Texas. Mr. Egan went to his new post September 1.

What the Well-Dressed Heater Will Wear ≈ ≈



IT IS whispered about in the best Cellar Circles that more rigid requirements as to costume will be insisted upon among the elite of water heater society during this season.

In keeping with a reputation already won for being the best dressed heater, Welsbach Hotzone is appearing in a stunning buff jacket, topped by a stiff, shiny black hat, with shoes to match. He is being received in more cellars than ever before.

To quote his own words, when better cellars are made, he will help to make them.

The Welsbach Hotzone pedigree bears witness to its dependability in action, its economy and low upkeep. Every product bearing the Welsbach name has a reputation to sustain. How well the Hotzone does it is evidenced by the fact that this year, Hotzone sales have boomed to a higher mark than ever before. *Hotzone has a way with the women that appeals.*

Write for prices and discounts, and start Hotzone going throughout your territory. Welsbach Company, Gloucester, N. J. Sales Offices in Principal Cities.

50 Hawthorne St., San Francisco, Calif.

Member Pacific Gas Association *Member American Gas Association*

Welsbach HOTZONE

SELF-ACTION GAS WATER HEATERS

OVER 8500 IN USE

PIONEERS

In every field there's a pioneer. Anson Robinson was the pioneer in the development and perfection of an orifice device for the measurement of gas, air, water or oil. This device, the Robinson Orifice Fitting, is broadly protected by U. S. Patent No. 1569305.

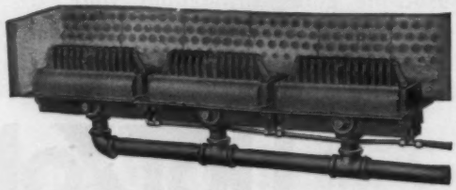
ROBINSON ORIFICE FITTING CO.
1435 SANTA FE AVENUE, LOS ANGELES, CALIF.

Distributors
The Foxboro Company . . Westcott & Greis, Inc.

English Distributor
Walker, Crosweller and Company
54-58 Queen Elizabeth Street, London, S. E. 1

ROBINSON
ORIFICE FITTING

R. M. C. Gas Burner



Unexcelled for Conversion Installation
ROTARY MANUFACTURING CO.
5720 Long Beach Avenue Los Angeles, California

Clevenger *in* West *for* P.C.G.A. Convention

KEITH CLEVENGER, director of publicity and advertising for the American Gas Association, made a swing around the national circuit in September, leaving A. G. A. headquarters early in the month to attend the 36th Annual Convention of the Pacific Coast Gas Association, held at Del Monte from September 10 to 13, and spending a brief time in Los Angeles before leaving the Coast for Texas and Oklahoma points. Mr. Clevenger brought a valuable message to the P. C. G. A. Convention in his address on cooperative advertising. He also brought word of A. G. A. plans for broadening its advertising service.

Keith Clevenger

ARGUS GAS COMPANY SOLD TO MOODY-SEAGRAVES

Kansas newspapers carry an announcement released by Arthur K. Lee, president of the Argus Gas Company to the effect that the Moody-Seagraves interests of Houston, Texas, have purchased the Argus company. It was stated that Mr. Lee and A. J. Hardendorf retained substantial interests in the Argus company in the transaction.

The Argus Gas Company, with headquarters at Dodge City, Kansas, has franchises in 15 towns in southwestern Kansas to which gas will be piped before December 1, according to report.

The gas line will originate in the Hugoton gas fields, going northwest to Dodge City. Plans also call for a line to be constructed in a southeasterly direction from the Hugoton fields serving Rolla and Elkhart in Kansas. Other towns in the Hugoton to Dodge City area where franchises are held are Meade, Fowler, Plains, Montezuma, Cimarron, Satanta, Sublette, Moscow, Copeland, Ensign, and Fort Dodge. Construction work in some of the towns has already commenced. Knupp-Fredell Company of Amarillo, Texas, has been given the contract for the line.

CONRAD, MONTANA, PIPELINE NEARLY COMPLETE

Pipe laying crews are busy on the natural gas line which will serve Conrad, Montana. A. J. Enstness, manager of the Pondera Utilities Company, which is building the line, announced that gas would be ready for distribution by the first of October.

Valier, in the same section, recently granted the Pondera Utilities Company a franchise for the service of natural gas. The line will be a branch from the main line to Conrad, and will be 14 miles long.

R. M. HUTCHINSON ACCEPTS POST WITH HOUSTON NATURAL

Robert M. Hutchinson has accepted a position with the Houston Natural Gas Company, as gas engineer. He was formerly with the Public Service Company of San Antonio.

MOST HEAT PER DOLLAR

A New Automobile or a More Comfortable Home—WHICH?

There is real competition when the family begins to debate the attractions of the shiny, new speedster against the advantages of a gas heated winter home. Every member of that family knows everything there is to know about the handsome, low slung, hill climbing new car model. The automobile dealer does not miss a single prospect in his territory . . . his salesmen are planting sales-bearing seeds all the time.

There's a ROBERTS UNIT for every size and type of HEATING PLANT

The gas company is in a position to do a far better job of merchandising. People want comfort during the cold, dreary winter. But, few of them know about gas for complete home heating. Choose the Roberts Controlled Gas Heating Unit for your more-gas-sales weapon. Then turn a few salesmen into the field. You'll be surprised at the ease with which larger and larger sales of gas come. Every assistance will be given you . . . even a trained man to break in your sales crew.

ROBERTS CONTROLLED GAS HEATING UNIT

Investigate this opportunity, NOW.

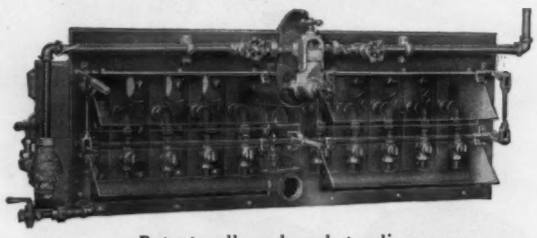
ROBERTS-GORDON APPLIANCE CORPORATION

DELAWARE AVENUE AT TUPPER STREET

CURTISS BUILDING BUFFALO, N. Y.

The Leahy Multi-Jet Unit

Is an investment that will increase operating efficiency and decrease operating cost



Patents allowed and pending
View showing Combination Gas and Oil Unit

Designed for Front, Rear and Vertical Firing, Burning Efficiently Low or High Pressure Natural or Manufactured Gas

Exclusive features that have created exceptional demand for this unit:

1—Designed with no draft loss.
2—High overloads on low gas pressures with minimum draft.
3—Each individual burner receives correct air and gas mixture for maximum efficiency.
4—Auxiliary air opening around tile increases overload capacity of unit with no sacrifice in efficiency.
5—Correct amount of air for combustion can be obtained with minimum opening in stack damper, which retains heat in boiler instead of letting it escape up the stack.
6—Does not require high gas velocities through burner in order to draw sufficient air for combustion.
7—All primary and auxiliary air is admitted through unit and evenly distributed to each burner.
8—Equal distribution of heat full width of firebox.
9—All parts individual and removable.
10—The oil burner can be inserted in the unit or removed instantly.
11—Equal efficiency on gas or oil.

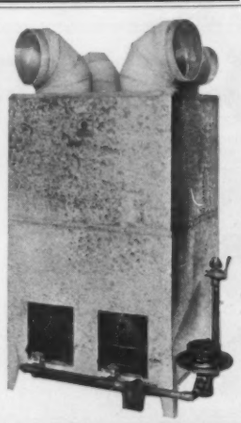
An Efficient, Indestructible, Portable Unit with a Low Initial and Upkeep Cost

Request literature, data, and installation prints on our

Oil and Gas Burning Equipment

LEAHY MANUFACTURING COMPANY

1804-1810 East 8th Street Los Angeles, Calif. Established 1902



Furnace Service

How much of your overhead is represented by unnecessary trips to your job?

In other words does your furnace or your service man render your service?

Install **Perfection Multiple Unit Furnaces** and cut down on your overhead.

TESTING LABORATORY APPROVED

L. H. Freymuth Jr

311 East Pico St., Los Angeles

F. H. Doyle *to* Head New P. G. *and* E. Department

FRED H. DOYLE, who has been in charge of engineering design in the construction work of the Pacific Gas and Electric Company's natural gas development in California, has been named manager of that company's Natural Gas Division. Mr. Doyle's appointment became effective September 1. The Natural Gas Department is a newly organized one.

Fred H. Doyle

Mr. Doyle brings a background of splendid experience in the natural gas field to his new position, having been general field superintendent of the Midway Gas Company, and more recently supervising engineer of the Southern California Gas Company. He has been in the natural gas industry since 1912, being at that time associated with the Kansas Natural Gas Company, leaving there to take the position with the Midway. Mr. Doyle has been with the P. G. and E. since January.

NORTHWESTERN NATURAL GAS CO. LINE IN WASH. UNDER WAY

The natural gas transmission line from wells in the Rattlesnake Hills in Washington to the Yakima Valley, is now under construction by the Northwestern Natural Gas Company, with headquarters in Prosser, Washington. Seven wells are now producing the gas, and the 6-inch transmission line will be 26 miles long. Laterals will serve Prosser, Grandview, Sunnyside and Mabton. R. B. Newbern, formerly president of the Rice County Natural Gas Company and manager of the Larutan Fuel Company, is president of the Northwestern Natural Gas Company; R. E. Combs, geologist and petroleum engineer, is vice-president; and Edwin Hurst, formerly manager of the Rice County Natural Gas Company, is manager.

NEW GAS MANUFACTURING PLANT FOR B. C. ELEC. UNDER WAY

Construction of the new emergency gas manufacturing plant of the Birtish Columbia Electric Railway Company at Victoria, B. C., has now been completed. Work was commenced immediately following the arrival of the carburator machinery. Installation will cost approximately $50,000, and the new apparatus will be placed in a steel and concrete building. The daily capacity of 500,000 cubic feet will double the capacity of the Victoria system.

CALGARY GAS EXPORT CO. WANTS TO SELL GAS IN MONTANA

The Calgary Gas Export Company has asked the Canadian Government for a permit to sell gas over the border to Montana towns. Several of these towns have tentatively agreed to purchase the gas in case the application is granted. A company will be organized as a subsidiary to distribute gas on the American side. The government is investigating the extent of the Turner Valley gas field supply before making a decision.

No Better Gas Range Was Ever Built!

THE 1930 A-B ARISTOCRAT

Based on the foundation of *superior baking qualities and long life,* characteristic of A-B products, the 1000 Series gas ranges offer a number of unusual and exclusive features. The Insta-Flame (patented) gives 'heat at the turn of the valve,' on any burner, including the oven; the Sani-Tray (a porcelain clean-out tray to keep the oven bottom spotless), an improved Service Drawer, and the AutomatiCook heat control are regular equipment. Available in three full enamel finishes — grey and white, white with red handles, and green and ivory.

Send for details TODAY!

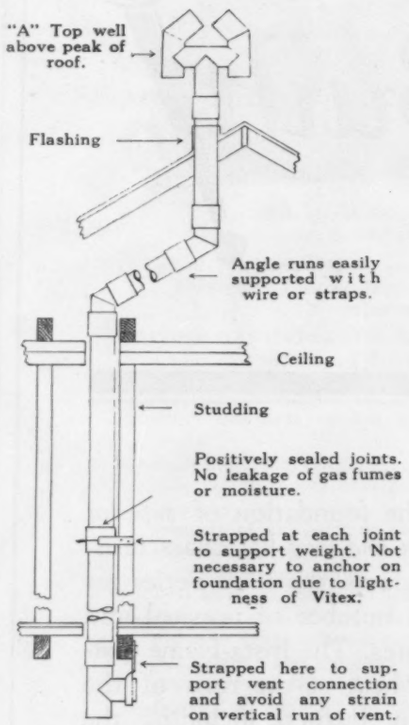
"Outstanding Among All Fine Ranges"

A-B STOVE COMPANY

Battle Creek, Michigan

VITEX The Perfect Gas Vent & Flue Pipe

Illustrating Method of Installing Vitex on Concealed Runs.


"A" Top well above peak of roof.
Flashing
Angle runs easily supported with wire or straps.
Ceiling
Studding
Positively sealed joints. No leakage of gas fumes or moisture.
Strapped at each joint to support weight. Not necessary to anchor on foundation due to lightness of Vitex.
Strapped here to support vent connection and avoid any strain on vertical run of vent.

Solves the venting problem where no flue exists. Can be installed at low cost without foundation. Semi-vitrified, light in weight, absolutely non-corrosive and high in insulating value. Improves combustion by increasing draft.

Samples, prices and installation data gladly furnished on request.

PLANT

Rubber & Asbestos Works

537 Brannan Street **San Francisco, California**

Fire Brick Contractors

Established 1906

J. T. Thorpe & Son

Inc.

Specializing in Gas Generator, Boiler, Still and Furnace Brick, Industrial Furnaces, Retorts, Kilns, Brick Smokestacks.

A capable Engineering Department competent to advise on any problem involving firebrick construction.

San Francisco	Seattle	Portland	Los Angeles
417 Market St.	305 White Bldg.	609 Ry. Exch. Bldg.	321 W. 3rd St.

Monroe-St. Louis Gas Line Nearly Complete

WITH the exception of some of the river crossings, most of the work has been completed on the 460-mile natural gas line extending from Monroe, Louisiana, to St. Louis, and gas will in all likelihood be turned into the carrier before November 1.

The two-subcontracting firms under Ford, Bacon & Davis have withdrawn a large number of their pipeline men as the work has neared completion, many of whom have been utilized on the line being constructed from Monroe to Birmingham and Atlanta.

Williams Bros., Inc., of Tulsa, and the Oklahoma Contracting Company of Dallas are the two sub-contractors on both the Monroe to St. Louis line and the Monroe to Birmingham line of which Ford, Bacon & Davis are the general contractors.

The part of the line, on the St. Louis project, lying between Monroe and the north bank of the White river at Newport, Arkansas, was constructed by Williams Bros., Inc., and the Oklahoma Contracting Company had the contract from the White river into St. Louis. The former organization also has the contract for all river crossings.

Construction view on St. Louis line, unit north of Newport, Arkansas—putting bolts in Dresser couplings.

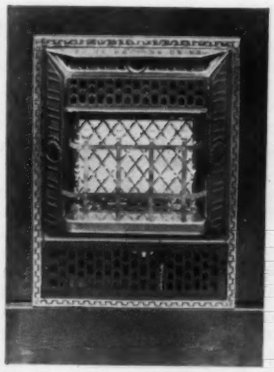
Approximately 2,000 men have been employed on the line since about the 15th of April. The Mississippi River Fuel Corporation, with the Standard Oil Company of New Jersey, the United Gas Company of Houston, the Electric Bond & Share Company and the United Carbon Company, as principals, is building the line which will supply natural gas for industrial purposes in St. Louis and environs. Gas will also be supplied from the line to a number of towns along the route.

E. P. MILLIKAN EXHIBITS "MAGIC CHEF" TO P.C.G.A. MEMBERS

E. P. Millikan, of George M. Clark & Company, of Chicago, was a visitor on the Coast during September. Mr. Millikan demonstrated the new "Magic Chef," the new model manufactured by the American Stove Company, at the Pacific Coast Gas Association Convention at Del Monte.

Pacific A. G. A. Approved Appliances

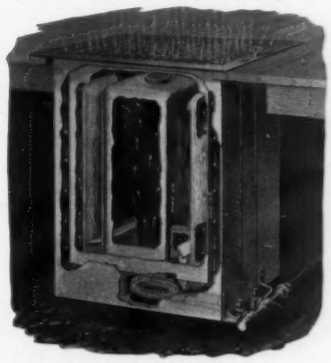
will get you in on every heating job in your territory



"Pacific" No. 02 Floor Furnace

Approved by A.G.A.

A sturdily constructed pipeless Unit of 20 gauge Ingot Iron with an attractive floor grill of heavy cast iron, finished in antique bronze or brass. Heating element has top and bottom of cast iron, assuring many years of uninterrupted service.



Wall Heaters

—Two Models

Models 7 and 8-A Wall Heaters are equipped with the Multi-tubular burner which has proven so popular and efficient in other "Pacific" products. The attractive appearance and sturdy construction coupled with its efficiency in rendering cheerful heat will prove a quick seller and should be displayed on your sales floor.

The Pacific Furnaces, with the recognized advantages of the "round" design, eliminates all corners and dead air spaces. It promotes better circulation, giving an abundance of heat more quickly. The heating element is completely welded throughout, is gas tight, and permits no combustion fumes to escape. The heating unit is of 20-gauge pure Ingot Iron metal. They are equipped with the special Multi-Tubular Burner.

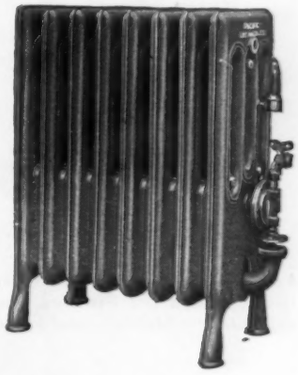
The Multi-Tubular Burner

Each burner has its independent injection of gas. Primary air for combustion is directly siphoned at each burner. There is no need for adjusting of the gas and air for combustion, as this new Pacific Burner is scientifically designed to automatically give the correct proportion of air to gas. This results in complete combustion and a high temperature flame of proven economy. No soot. No odors.

Gas Steam Radiators

The Pacific Unvented Gas Steam Radiators are now available in four column pattern. A size for every demand, 26, 32, and 38 inches high. The Pacific Gas Steam Radiators are approved by both the American Gas Association Laboratory and the Underwriters Laboratories.

Our agency proposition is very attractive—write for particulars concerning your locality.



Get in on Every Heating Job in Your Territory

Pacific Gas Radiator Company

Gas Heating Headquarters

Manufacturers of Every Type of Gas Heating Appliances

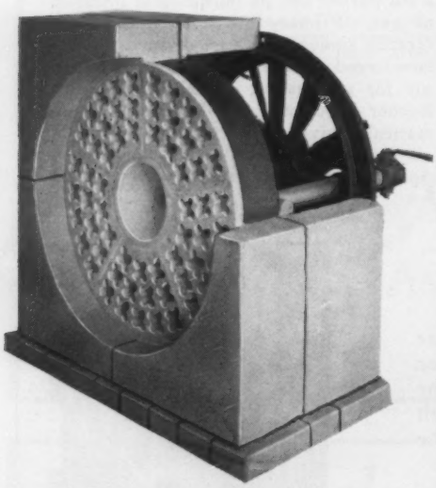
Roseberry and Walter Streets, Huntington Park, California

WEBSTER
RADIANT
GAS BURNERS
IN THE
POWER FIELD

A roster of Webster customers in the power field reads like a "Who's Who" in Western Industry and Power. From municipal and public utility power plants to all kinds of industrial plants, you'll find Webster equipment in satisfactory service.

There's a size and capacity of burner ready for easy and quick installation on any type of boiler, from 30 H.P. up! And you need have no hesitancy in promising superior economy, instant service for emergency overloads at the same high efficiency as for normal operation without "puffing" or "vibrating."

Ask us for literature to help reach your more active prospects.



Furnace side of No. 200 Combination Gas and Oil Burners, showing refractory blocks and radiants

WEBSTER
ENGINEERING
COMPANY
Tulsa, Okla.
DIVISION OF
The Surface Combustion Co. Inc.

Pipe Joint Research Progress

By K. R. KNAPP

Research Engineer
American Gas Association Testing Laboratory

THE Pipe Joint Committee of the Technical Section of the American Gas Association has for some time had a program under consideration for research in this field. A tentative outline of the work was presented at the 1928 Convention. This plan proposed that an engineer be secured to take charge of the work under the direction of the A.G.A. Testing Laboratory at Cleveland. As a result, the writer, who had formerly been connected with the United Gas Improvement Company of Philadelphia for the past 18 years, assumed active charge of the work on July 1.

A meeting of the Sub-Committee was held early in July. It was decided that for the present, joints of the bell and spigot type only would be considered. A detailed testing program consisting of three distinct parts was agreed upon. These are first, an investigation of old joints removed from service to determine the best means of correcting leakage; second, a series of tension and compression tests of new joints made of various materials; and third, a study of the chemical and physical properties of common joint materials such as lead, yarn and rubber.

It is proposed to conduct the work upon such old joints as may be submitted upon request by member companies at the A.G.A. Testing Laboratory where the needed facilities are being provided. This part of the investigation will deal entirely with joints which have been found leaking in service and will be confined to a study of their condition and the determination of the best means of properly repairing them permanently. Each company submitting such joints will be asked to fill out a questionnaire prepared by the Laboratory, giving in detail the history of the joint.

The testing of new joints prepared in different ways and using various materials such as lead, cement, and rubber will be conducted for the most part at university laboratories, where the necessary testing machines of proper capacity are available. It is planned to test the smaller sizes at Case School of Applied Science in Cleveland and the larger sizes at the University of Pennsylvania in Philadelphia. Suitable arrangements have been concluded with both institutions. In these examinations the joint is subjected to a series of alternate tension and compression tests to reproduce the condition of contraction and expansion of the main occurring in winter and summer respectively. The joint is kept under constant pressure and any leakage noted. In this way the equivalent of a number of years of service as regards the stresses caused by underground temperature changes can be brought about in a short time and the relative performance of various kinds of joints obtained.

In the remaining phase of the problem dealing with an investigation of different jointing materials, it is planned to utilize the facilities of the Metallurgical Department of Case School of Applied Science in making a study of lead. This will include the preparation of micro-photographs showing the structure of various commercial leads. Similar photographs will also be taken to show the effective depth of caulking done in various ways and the effects of the presence of foreign substances in lead.

Other jointing materials such as yarn and rubber will be investigated at the Laboratory as rapidly as the details of the necessary tests can be worked out.

In the comparatively short time that has elapsed since active work was started, considerable progress has been made. A number of leaking joints have already been submitted from different parts of the country. Testing work on the smaller new joints is now well under way. The necessary castings for some of the larger sizes have been ordered and it is expected that actual work will be started in Philadelphia in the near future. A number of typical samples of yarn and lead in common use have been accumulated and are now undergoing test. While it is still to early to report any definite results it is expected that these will become available in the near future.

ON PIPE JOINT COMMITTEE

The Pipe Joint Committee is made up of the following:

H. E. Bates, The Peoples Gas Light & Coke Co., Chicago, Ill.

F. M. Goodwin, Boston Consolidated Gas Co., Boston, Mass.

O. S. Hagerman, American Light & Traction Co, Chicago, Ill.

H. W. Hartman, American Gas Association, New York, N. Y.

E. D. Milener, American Gas Association, New York, N. Y.

U. G. I. CONTRACTING TO BUILD MUSCATINE, IA., PLANT

The Iowa Electric Company of Cedar Rapids, Iowa, has contracted with the U. G. I. Contracting Company division of United Engineers & Constructors, Inc., of Philadelphia, for an additional water gas apparatus for their plant at Muscatine, Iowa. This apparatus will consist of a 6-foot U. G. I. carburetted water gas plant, arranged for soft coal operation, and with the set will be provided the necessary operating floor for the new set, and re-construction of the floor for the old set.

EVANSTON, WYOMING, NOW BEING SERVED FROM BAXTER BASIN

The pipeline which brings natural gas from Baxter Basin to Evanston, Wyoming, is complete, and gas is now being served to consumers. The line is a branch from the main line to Salt Lake City.

HARRAH, OKLA., GRANTS FRANCHISE TO J. A. S. WRIGHT

J. A. S. Wright of Tulsa, Oklahoma, late in August was granted a franchise for the service of natural gas in the town of Harrah, Oklahoma. It is expected that the system will be in operation by November 1.

POSITIVE CONTROL of the Heating Load

There is no longer a question about the advisability of clock equipped room thermostats, say gas company executives who have studied their way through the whole problem.

Boiled down to essentials, here are the reasons why these men insist on clocks:

(1) Clock thermostats prevent a morning super-peak by bringing on the heating load well before the cooking and hot water demand.

(2) Clock thermostats give the consumer a tangible fuel saving (varying, of course, in each installation).

(3) Clock thermostats give the consumer the completely automatic heating he wants, cool rooms to sleep in, warm rooms to dress in, without the slightest need to tinker with the thermostat.

The first advantage bears directly on your major problem of controlling the heating load. The second and third pay handsome dividends in consumer good will, your strongest salesman of new installations in every neighborhood.

ARTHUR F. ERICKSON COMPANY
Pacific Coast Distributors

557 Market Street
SAN FRANCISCO, CAL.

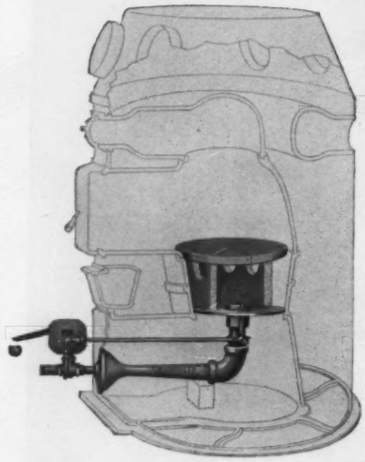
Selling Building
PORTLAND, OREGON

Terminal Sales Building
SEATTLE, WASH.

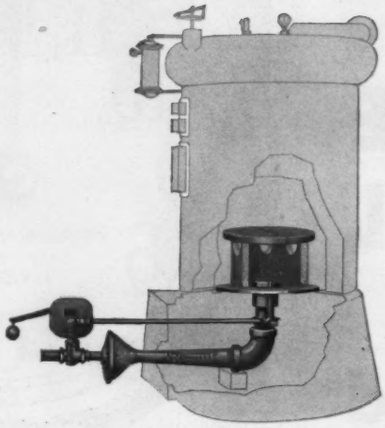
MINNEAPOLIS HEAT REGULATOR HONEYWELL

MAXON

Conversion Gas Burners



The above is an application to a warm air furnace. This is complete automatically controlled. The burner is easily installed and the unit is fool-proof, making it a very dependable conversion unit for gas companies to recommend and sell.



This is an application to a round boiler. The burner is equipped with a snap-acting valve which can be attached to the existing furnace chain and manually controlled from upstairs. Either automatic or hand-controlled is recommended.

Write for prices and discounts

MAXON PREMIX BURNER CO.

INDUSTRIAL FUEL BURNING EQUIPMENT — FOR OIL OR GAS, OR BOTH COMBINED

MUNCIE — MAXON PREMIX BURNER — INDIANA

Reynolds

Gas Control Since 1892

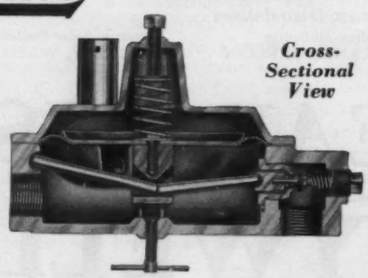
Reynolds Little Giant Regulator

Products for all kinds of Pressure Reduction—for either artificial or natural gas.

GOVERNORS—Intermediate Pressure, Triple Outlet, Holder, Toggle Type Street.

REGULATORS—High Pressure Service, Low Pressure Service, High Pressure Line, Single and Double District Station.

VALVE—Automatic Quick Closing Anti Vacuum.



Cross-Sectional View

Reynolds Gas Regulator Company
Anderson, Indiana

Wadsworth *in* Charge *of* Westcott Co.'s Plant

A. V. Wadsworth

A. V. WADSworth, formerly vice-president and general manager of the Pittsburgh Valve Foundry and Construction Company, has been elected executive vice-president of the Westcott Valve Company at East St. Louis, and has taken charge of the company's operation after an absence of six months. Mr. Wadsworth was secretary and treasurer of the Westcott Valve Company for several years, severing his connection last February and going to Pittsburgh.

The Continental Supply Company distributes Westcott products throughout the gas and oil fields.

GAS APPLIANCE SOCIETY MEETS SEPTEMBER 18

That the San Francisco Gas Appliance Society will no longer participate in special shows such as Food Show and the California Industries Exhibition was indicated by the discussion and action of its members in a meeting held in the Clift Hotel, Wednesday, September 18. The dealer members felt that if the manufacturers want to go into the show, they might be justified in doing so, but the manufacturer members indicated that the expense of this type of publicity has been too great for the results obtained.

Secretary C. P. Hering during the meeting brought before the membership the question of the State Building Code that is being advocated by the California State Chamber of Commerce, formerly called the California Development Association.

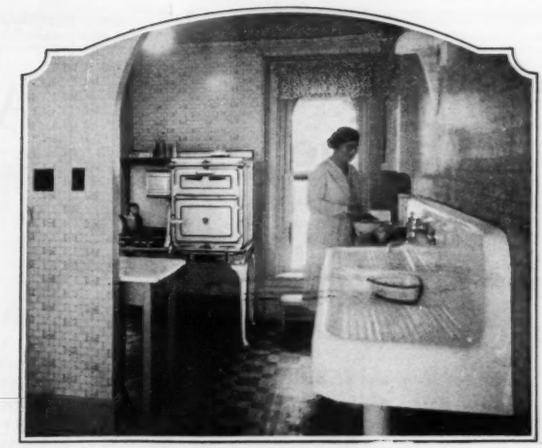
There was also discussion of the question of a model gas ordinance, but no action was taken. Ed Lachman, president of the society, was in charge of the meeting.

MERCO NORDSTROM OFFERS CASH PRIZES FOR SLOGAN

Offering $500 in cash prizes for the best slogans to be submitted by anyone prior to December 31, the Merco Nordstrom Valve Company has launched a slogan contest. The company is seeking an appropriate slogan that can be used in connection with the publicizing of its valves. Anyone may try his genius in creating a slogan of not more than 10 words, and may send as many slogans as he desires. The slogan can pertain to the service or function of Nordstrom Valves or can be any "saying" that suggests the successful service of the valves in various industries. The slogan "Won't Leak—Won't Stick" is used at present.

The first prize is $250.00, second is $100.00, and the third $50.00. The next four prizes are $10.00 each and the next 12 prizes, $5.00 each.

Those who desire to enter the contest may send for a catalog which gives full details regarding the valves. The company may be addressed at 343 Sansome St., San Francisco.



This illustration is from a series of Chambers advertisements running in National women's publications.

Mrs. Smith of Porter, Indiana, in her attractive Chambers equipped kitchen

Why Mrs. Florence Busse Smith Selected a Chambers Range

Because it is the ultimate in cooking appliances

Awarded the Grand Prize, Paris, 1928. Approved by leading cooking institutes and by American Gas Association.

Grand Prize Paris, 1928

You would be selling more gas ranges at a better profit than you normally enjoy, if you handled the Chambers Autostat Gas Range. This is a provable fact.

Simply because this range outperforms any and every other range.

When rightly presented, the retail prospect cannot withstand the appeal of this notably fine cooking appliance.

Here is an instance:

A housewife in South Bend bought a thoroughly modern conventional gas range that satisfied her in every respect until she saw the Chambers.

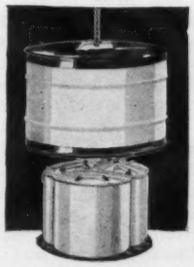
She sacrificed $60 on a range that was only 60 days old; spent $125 more to remodel a kitchen alcove, and paid a far higher price for the Chambers Range itself because she became so overwhelmingly enthusiastic for Chambers advantages. And she was not a wealthy woman.

That indicates what a strong selling proposition we have for dealers in territory not now covered. Write us if you want details on the Chambers franchise.

THE CHAMBERS MANUFACTURING CO.

25 Columbus Park **Shelbyville, Indiana**

Originators of the insulated gas range, the Thermodome and the Autostat



Chambers AUTOSTAT *Gas Range*

The Chambers Thermodome provides top stove cooking on stored heat. A heavily insulated drum envelops the stewing kettles so that the gas is burned but half the normal period. The results are excellent. Because less water is required, food salts and food flavors are conserved.

In oven baking also, the retained heat principle is followed. Heat from the burners is imprisoned within completely insulated walls. Then there is the Chambers Autostat which removes all the guess from baking, besides freeing the housewife from the kitchen. This exclusive device is set to shut off the gas completely at exactly the right time.

An Automatic Water Heater In Every Home

The TROOPER Automatic Storage Heater

will enable you to bring this about.

It can be sold to your customers for as low as **$55.00,** with a fine profit for yourself. Its low price will attract customers and its high quality will make the sale.

Notice these features never before offered in a low-priced storage heater:

Heavy COP-R-LOY Tank,

Automatic Safety Pilot,

Guaranteed accurate Thermostat,

Heavy Insulation,

Brass Water Connections,

Ivory Enamel Finish

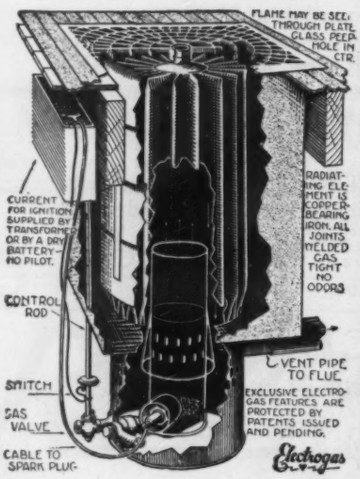
TROOP WATER HEATER COMPANY

Pittsburgh, Pa.

Southern Office & Warehouse, 2625 Elm St., Dallas, Texas.

Branches in all Principal Cities.

Electrogas


FLAME MAY BE SEEN THROUGH PLATE GLASS PEEP HOLE IN CTR.
CURRENT FOR IGNITION SUPPLIED BY TRANSFORMER OR BY A DRY BATTERY—NO PILOT.
RADIATING ELEMENT IS COPPER-BEARING IRON. ALL JOINTS WELDED GAS TIGHT NO ODORS
CONTROL ROD
VENT PIPE TO FLUE
SWITCH
GAS VALVE
EXCLUSIVE ELECTRO-GAS FEATURES ARE PROTECTED BY PATENTS ISSUED AND PENDING.
CABLE TO SPARK PLUG
Electrogas

—The Officers' Quarters, San Francisco Presidio, are heated by these remarkable floor furnaces.

Manufactured in San Francisco

Electrogas

PATENTED

Martin Unit Gas Furnaces

ARE THE RESULT OF 38 YEARS HEATING EXPERIENCE

MADE IN FOUR SIZES

Electric, Thermostat or Manual Control

Approved by A. G. A. Laboratory and by the City of Los Angeles

Write for your copy of "Modern Heating Methods"

PHILLIPS HEATING, VENTILATING & MFG. CO.

1710 W. Washington St. Los Angeles, California

Live Agents Wanted

TESTING LABORATORY A.G.A. APPROVED

Arkansas Natural *to* Serve More Southern Towns

ARKANSAS Natural Gas Company's 100-mile, 20-inch natural gas line from the Monroe and Richland area to Shreveport is rapidly nearing completion. Construction began on the line in June.

At Sterlington, 20 miles from Monroe, a 10,000 h.p. compressor unit is being constructed at a cost of $1,000,000. This station will not only boost the gas in the new Shreveport line but connections are also to be made with the 16-inch line to Eldorado, Arkansas, recently acquired by the company.

In addition to the above construction the Arkansas Natural through its subsidiary, the Arkansas-Louisiana Pipeline Company, is laying plans for the construction of an 8-inch line to supply gas to 12 East Texas towns, in which the Southern Cities Distributing Company, the retail agency of the Arkansas Natural, has franchises.

The supply for the 12 towns will be obtained from the Shreveport to Little Rock 18-inch main, the connection being made at the Rogers compressor station north of Oil City, La. One hundred and thirty-six miles of line will be laid, 50 miles of which will be 8-inch and the remainder 6-inch. The main line will be constructed from the Rogers station to Pittsburgh, Texas, with lateral lines being laid to adjacent towns, among which are Mount Vernon, Mount Pleasant, Jacksonville, Avinger, Linden, Gilmer, Hughes Springs, Omaha, Dangerfield, Winnsboro and Naples. This line is to be completed by December 1.

The company is also constructing 25 miles of 6-inch line from Camden to Fordyce, Arkansas.

All of the contracts for the distribution of gas in the Shreveport division, formerly held by the Arkansas Natural, have now been transferred to the Southern Cities Distributing Company.

Retail franchises and properties recently transferred to this company are Plain Dealing, Belcher, Gilliam, Houston, Oil City, Pine Island, East Point in Louisiana, and Doddridge, Garland and Fouke in Arkansas. The Arkansas Natural recently purchased franchises and distribution systems in these towns from the Moran Corporation of the South.

NEW BOOKS ON METER OPERATION BY AMERICAN METER CO.

A new book, 6 inches by 9 inches, bound in Castillian cover, containing 104 pages, with about 100 illustrations and tables, has recently been published by Metric Metal Works of American Meter Company, for use in the operation of Westcott orifice meters for gas, air, steam, oil or water.

This book has been designated at Bulletin E-2 and is distinct from the new Catalogue EG-2 on Westcott orifice meters, which has also been made available to present and prospective users of this type of meter.

Other publications which have been issued recently by the company are:

Bulletin E-5, describing the method of installation of rate-volume controllers for automatically controlling the rate of flow of air, gas, oil, steam, water and other liquids.

Bulletin E-3 Metric Indicating Flowmeters for gas, air, steam, oil and water.

Laboratory Bulletin E-1, containing a description of American Meter Company's laboratory at Metric Metal Works, Erie, Pa.

AN OUTSTANDING CONTRIBUTION to GAS HEATING

• FOURTH •

POSITIVE MECHANICAL CONTROLS

ABSOLUTELY POSITIVE IN ACTION...NO DIAPHRAGMS OR MAGNETIC CONTROLS... ENTIRELY MECHANICAL

IDEAL GAS BOILERS

MADE BY

AMERICAN RADIATOR COMPANY

SOLD BY

AMERICAN GAS PRODUCTS CORPORATION

376 LAFAYETTE STREET . . NEW YORK

GAS or WATER Connections

whether screw thread or gasket, should be made up with KEY TITE PIPE JOINT COMPOUND.

KEY TITE PIPE JOINT COMPOUND is not a quick hardening cement, but a plastic lubricant and a filler that will seal the most obstinate joint with ease. It covers more surface than an equal volume of red or white lead, thereby reducing the cost. It is waterproof—and there is no waste.

Manufactured by

E. A. Key Co., Inc.

2814 Santa Fe Ave.
Los Angeles, Calif.

Distributors in all principal cities.

WRITE FOR FREE SAMPLE

Gas Equipment Companies Form Holding Corporation

ON Saturday, August 31st, negotiations were completed whereby The Stacey Engineering Company, a new Ohio corporation operating as a holding company, took over the following manufacturing concerns:

The Stacey Bros. Gas Construction Company of Cincinnati, Ohio; The Connersville Blower Company of Connersville, Indiana; Wilbraham-Green Blower Company of Pottstown, Pennsylvania.

For a long period of years all of these firms have been engaged in the construction of gas holders, blowers and other apparatus used by gas, by-poduct gas companies and oil companies. In addition to these three companies, the new corporation has a substantial interest in other allied organizations.

The new company is headed by Beman G. Dawes, chairman of the board of The Pure Oil Company. With him are associated Carmi A. Thompson of Cleveland, F. S. Heath of Columbus, and others, as well as a number of the operating heads of the concerns named.

The Stacey Engineering Company is incorporated with an authorized capital of $2,500,000 of 6 per cent peferred stock, 150,000 shares of "A" stock and 200,000 shares of "B" stock, none of which will be offered to the public at this time The directors of the new company are as follows: B. G. Dawes, F. S. Heath, Carmi A. Thompson, Wayne Stacey, William A. Miller, John T. Wilkin and Chas. A. Ward; and the directors have elected the following officers: B. G. Dawes, chairman; Carmi A. Thompson, president; John T. Wilkin, F. S. Heath and Wayne Stacey, vice-presidents; D. H. Mulloney, secretary; Chas. A. Ward, treasurer.

The Stacey Bros. Gas Construction Company has specialized in the field of gas holder and purifier construction. During the past few years it has built three 10,000,000 cu. ft. holders which are among the largest in the United States. Recently it has developed the "Stacey Bullet" for high pessure storage and has acquired the American rights for the construction of the Kloenne type of waterless or piston gas holders which have been highly successful in Germany and England. The Stacey Bros are pioneers in the gas holders business of this country, having personally supervised their business for over 50 years, following in the footsteps of their father, George Stacey, who brought over his experience in holder construction from England. W. A. Miller, general manager, has long been associated with the gas industry.

The Connersville Blower Company was organized in 1893. It now manufactures more than 100 different types of blowers, and in addition controls patents on a new type of station meter. It also controls patents on its products in numerous foreign countries, where a growing business has been developed.

The Wilbraham-Green Blower Company is one of the oldest companies of its kind and has enjoyed a long and successful career.

All three of these companies will be officered by their present organizations. It is the purpose of the new company to furnish additional capital for a large expansion of the business. In addition to this, many economies will be effected by uniform operations of the several companies in reaching similar markets. It is also expected that a largely increased business with the oil trade will be built up, a market which these companies have only touched upon in the past.

The home offices of The Stacey Engineering Company will, for the present, be located in Columbus, Ohio.

W. E. KEEFE IS PRESIDENT OF CIVIC ORGANIZATION

WALTER E. KEEFE, district manager for the Southern Counties Gas Company at Monrovia, California, has been elected to the presidency of the Associated Chambers of Commerce of the San Gabriel Valley. This Association embraces 22 separate cities in the San Gabriel Valley and sponsors many projects for civic improvement in the section. It was through its initiative that the construction of the San Gabriel Canyon Dam, at an approximate cost of $25,000,000, was begun.

Walter E. Keefe

Mr. Keefe has been for many years a director of the Association, as well as of the Monrovia Chamber of Commerce, and has been president of the latter organization for the past three years. He is also president of the Monrovia Pageant Fiesta Association, a director of the Foothill Breakfast Club, and a member of the Advisory board of the Arcadia branch of the Bank of Italy.

COMMUNITY NATURAL COMPLETES SYSTEM FOR 30 TOWNS

Before cold weather sets in, the Community Natural Gas Company of Dallas, subsidiary to the Lone Star Gas Company, will have completed city distribution plants in a large number of towns adjacent to its system, to which gas will be supplied for the first time. Gas will be ready for distribution in approximately 30 new towns by the last of October, and franchises are being obtained in additional cities.

Eight new towns will be supplied with gas through a line approximately 100 miles in length, connecting with one of the main lines of the Lone Star at Branbury, Texas, and having as its terminus, Valley Mills. En route gas will be supplied to Glenrose, Walnut Springs, Meridian, Clifton, Hamilton, Iredell and Valley Mills.

Another line being constructed from the junction point of the Terrill and Greenville lines to Athens, Texas, will supply gas to Segoville, Crandall, Scurry, Kemp, Mabank, Eustace, Malakoff and Athens. This line will extend south and east and will be approximately 70 miles in length.

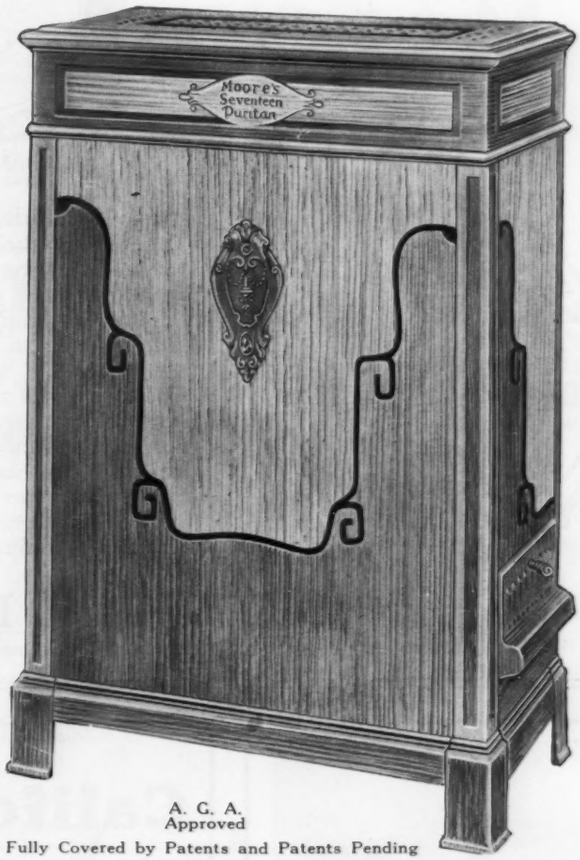
A line from Paris, Texas, to Clarksville is also to be constructed which will supply gas to Bagville and Detroit in addition to Clarksville. Another project originating at Eddy on the Tample line will serve Locke, Travis, Rosebud and Chilton. In Oklahoma the company has recently completed distribution systems in Snyder, Manitou and Snyder Park.

MOORE'S *Seventeen* PURITAN

"The Heater That Speaks for Itself"

MEETS EVERY HEATING REQUIREMENT

There is a distinct advantage in selling real economy and quality to a customer with the knowledge that a MOORE'S *Seventeen* PURITAN will meet his requirements in one of its three sizes or three finishes.



A. G. A.
Approved
Fully Covered by Patents and Patents Pending

THREE SIZES

Normal input ratings:

105,000 B.T.U.'s per hour.
70,000 B.T.U.'s per hour.
35,000 B.T.U.'s per hour.

THREE FINISHES

Two-Tone Walnut } **enamel**
Mahogany } **porcelain**
Velvo-Black

SAFETY FEATURES

The safety features of MOORE'S *Seventeen* PURITAN exceed those of any other gas fired heater now on the market.

It Takes More Than a Flame and a Casing to Make a Successful Circulating Gas Fired Heater.

MOORE BROTHERS CO., Joliet, Illinois

SINCE 1857

Re-Chrome Meter Leather

Re-Chrome Meter Diaphragm

BESSE, OSBORN & ODELL INC. · COLONIAL BRAND · BOSTON, U.S.A. · RE-CHROME METER LEATHER

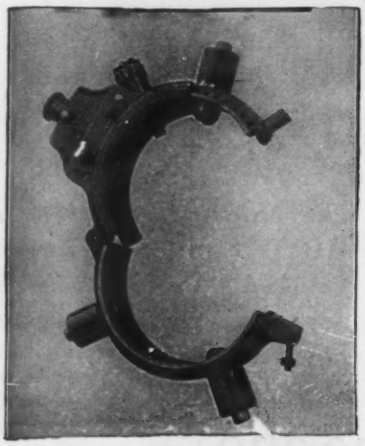
"Colonial" Brand

Made from choice New Zealand Lamb skins selected and tanned with the greatest care. Diaphragms made from this leather have the following advantages:—

Longer years service—More accurate measurement of gas—More impervious to water—Greater resistance to heat and climatic changes — Stronger fibre—Absorbs more oil—More Flexible—Eliminates "floppy" diaphragms.

Besse, Osborn & Odell, Inc.

51 South St., Boston 177 William St., New York



The STRICKLER

Ratchet Pipe Cutter

The STRICKLER Ratchet Pipe Cutter automatically cuts cast iron, steel and wrought iron pipe (from 1½ to 30" in diameter) by hand (either in the trench or in the shop).

You can cut any pipe from any position easily. Simply pump the handle and the STRICKLER does the rest. Order your STRICKLER Now

W. W. STRICKLER & BROS.

1475 Oak Street Columbus, Ohio

California Oxide

GAS Purification Requirements can be most efficiently cared for through the additional and improved facilities of our new plant in Southgate.

Both Maas and McKee Oxides have met gas purification requirements of the Pacific Coast over a period of several years and merit your investigation.

California Oxide Co.

308 East Eighth Street
Los Angeles

TRinity 0769

NORTH AMER. L. & P. BUYS MIDWEST TELEPHONE & POWER CO.

North American Light and Power Company has purchased the common stock of the Midwest Telephone and Power Company, owners of the Western Gas Company and the Western Pipe Line and Gas Company, according to an announcement made by the Public Utility Investment Company of Salina, Kansas, the parent organization of the Mid-West company.

The Western Gas company operates in Great Bend, Hoisington, Ellinwood, Larned, Lacrosse, Bison, Otis, Olmitz, Timken, Victoria, and Gorman, in Kansas.

Gas, according to the announcement, will be supplied these towns, under the new management, from the McPherson and Barber County fields, since the supply of gas in the original field in central Kansas is rapidly diminishing.

Gas properties at Anthony, Caldwell, Eureka, Neal and Toronto, Kansas, were not included in the transfer, but are retained by the Public Utility Investment Company, of which Nathan L. Jones is president.

Properties of the North American Light and Power Company include the Kansas Power Company, United Light & Power Corporation and the Kansas Pipe Line and Gas Company. The officers of the Mid-West Telephone and Power Company are Albert Patten of Topeka, president; B. I. Litowich of Salina, vice-president; Dwight Holmes of Chicago, secretary, and A. J. Berta of Chicago, treasurer. E. R. Duree of Salina has been appointed to the post of general manager of the new company.

INSULL INTERESTS BUY UNITED PUBLIC SERVICE CO. PROPERTIES

Middle West Utilities Company, a holding company controlled by the Insull interests, has purchased the gas properties of the United Public Service Company, operating in Oklahoma and Arkansas. The properties included in the purchase are the Southwestern States Gas Company, and the Arkansas Oklahoma Gas Company of Oklahoma, and the Fort Smith Gas Company, the Lavaca Gas & Oil Company, and the Ozark Natural Gas Company in Arkansas.

The Southwestern States Gas Company distributes gas in Muldrow and Salisaw, Oklahoma, purchasing it at wholesale from the Arkansas Oklahoma Gas Company, which secures its supply from the Gans gas field six miles east of Salisaw. The Arkansas companies distribute gas in Fort Smith and Van Buren and operate producing fields in that territory.

WATERLOO, IOWA, TO HAVE NEW WATER-GAS PLANT

The Iowa Public Service Company has awarded a contract to the U. G. I. Contracting Company division of United Engineers & Constructors, Inc., of Philadelphia, for installation at its plant at Waterloo, Iowa, of a 9-foot U. G. I. carburetted water gas set with Chrisman cycle, exhaust steam manifold, steel plate operating floor. A 6-cam Model "B" automatic control machine will be furnished for the operation of the set.

BOOKLET ON BOTTLED GAS IS PREPARED BY SPRAGUE

"Bottled Gas an Ally of the Gas Industry" is the title of a booklet just issued by the Sprague Meter Company. The booklet is designed to point attention to the importance of the bottled gas industry and also describes the "Changeulator", a bottled gas regulator device recently developed for this field by the Sprague Meter Company.

TIME-O-STAT Distributors now number 25—located in principal cities of the United States and Canada — serving Time-O-Stat Dealers and customers efficiently and well.

Hardly a single Dealer is more than 12 hours distant from his nearest Distributor. Most of them are even nearer. As a result, Time-O-Stat Dealers are able to offer a service unique in the field for its efficiency, promptness and thoroughness.

Users of automatic controls appreciate real service, quickly and cheerfully given! That's why practically any control in the entire Time-O-Stat line can be successfully ordered for immediate delivery. Installation can be had when needed. There are no days and weeks of waiting for parts from the factory, for each Distributor carries an ample stock of Time-O-Stat products.

What's more, every Distributor has a trained organization ready to give cheerful service and cooperation to Time-O-Stat Dealers and their customers. Dealers and users of automatic controls will find it a pleasure to work with the Time-O-Stat Distributor . . . and by the way, have you noticed the completeness of our line of controls (listed below) . . . just write for catalog of the products which interest you!

TIME-O-STAT CONTROLS COMPANY
ELKHART INDIANA

Successor to
ABSOLUTE CON-TAC-TOR CORP.
TIME-O-STAT CORP.
LEACHWOOD COMPANY
CRAMBLET ENGINEERING CORP.

EXCLUSIVE TIME-O-STAT SERVICE

Factory Sales and Service Offices

① Boston, Mass.
② Chicago, Ill.
③ Detroit, Mich.
④ Elkhart, Ind.
⑤ Kansas City, Mo.
⑥ New York, N. Y.
Chicago, Ill.
4 Cincinnati, O.
5 Cleveland, O.
6 Columbus, O.
7 Dallas, Texas
8 Denver, Colo.
9 Los Angeles, Cal.
10 Milwaukee, Wis.
11 Minneapolis, Minn.
12 Newark, N. J.
New York, N. Y.
13 Oklahoma City
14 Omaha, Neb.
15 Philadelphia, Pa.
16 Pittsburgh, Pa.
17 St. Louis, Mo.
18 Salt Lake City, Ut.
19 San Francisco, Cal.
20 Seattle, Wash.
21 Washington, D. C.

Exclusive Distributors

1 Baltimore, Md.
2 Birmingham, Ala.
3 Buffalo, N. Y.

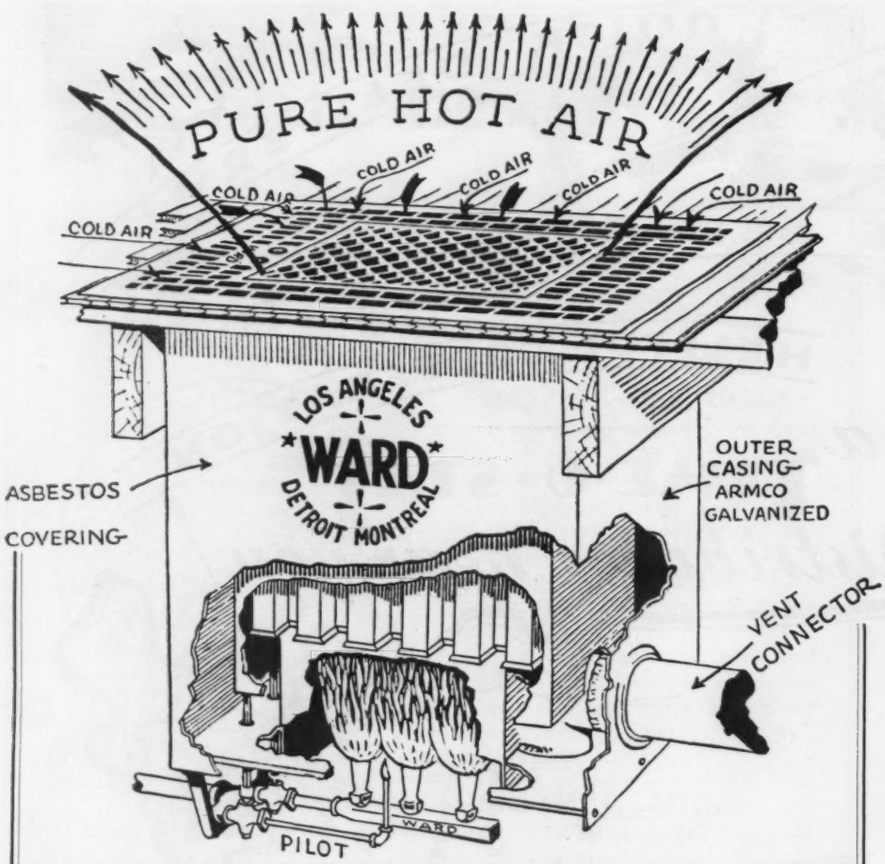
In Canada

22 Montreal, Province of Quebec
23 Toronto, Province of Ontario

Export Office

New York City
New York

Manufacturers of AUTOMATIC CONTROLS for Oil Burners · Gas Burners · Coal Burners · Electric Refrigerators · Furnace Fans · Mechanical Stokers · Industrial Ovens · Ice Machines · Unit Heaters · also of Sign Flashers · Mercury Switches · Electric Heaters · Corrugated Metal Bellows



The WARD GAS FLOOR FURNACE

Low Servicing Cost—In Los Angeles County, for example, there are 70,000 Ward floor furnaces. One service man adequately handles service needs in this territory.

A. G. A. Approval—The Ward measures up to the highest standards of this famous testing laboratory and bears the Laboratory Seal of Approval.

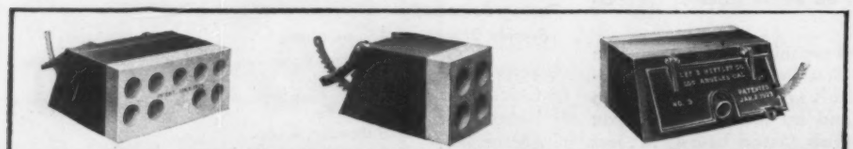
Wide Climatic Adaptation—Although made and widely used in Southern California, 50% of Ward installations are in sections where zero winter temperatures prevail.

Eliminates Sweating—Heating by the natural circulating air principle, sweating is eliminated in Ward heated homes. And, because the combustion chamber is hermetically sealed and vented outdoors, nothing but pure heated air can get into the house

These exceptional selling points plus substantial profit make the Ward very attractive to dealers. Write for full details.

WARD HEATER COMPANY

1243 SOUTH HOPE STREET, LOS ANGELES, CALIFORNIA



Mettler Entrained Combustion Gas Burners

FOR ALL Purposes Kinds of gas Pressures

406 S. Main St. LEE B. METTLER. CO. Los Angeles Cal.

F. W. Kirk *to* Manage *for* Houston Pipe Line Co.

FRANK W. KIRK has assumed the duties of general manager of the Houston Pipe Line Company, of Houston, Texas. His appointment was announced recently, following the sudden death of C. B. McKinney at his home in Houston on July 16. Mr. McKinney has been with the company for the past five years in the capacity of general manager.

Frank W. Kirk

Mr. Kirk came to the Houston Oil Company, parent organization of the Houston Pipe Line Company, in 1924 at the time when the first gas construction work of the organization was being contemplated. The Houston Pipe Line Company was organized in 1925, and for several years Mr. Kirk has been superintendent. His appointment to the new post was made late in August.

Prior to coming to the Houston Oil Company, Mr. Kirk had been associated with the Magnolia Gas Company and other leading gas utilities in the southwest. From boyhood he has been associated with the gas industry, having first started working as a schoolboy, on leases in western Pennsylvania.

INDUSTRIAL GAS CO. WILL SERVE CUSTOMERS OUTSIDE OF CITY

A group of Oklahoma City business men, about 30 in number, have formed the Industrial Gas Company for the purpose of piping natural gas from the new gas field southeast of the city to industrial customers located outside of the city limits. Packing plants and the Oklahoma Gas & Electric Company's Belle Isle power plant are among the industries to which gas will be marketed, it was stated.

It has been announced that the new company will not compete with the Oklahoma Natural Gas Corporation, which has the Oklahoma City gas franchise. The new company will sell natural gas only to industries outside of the corporate limits. The gas rate will range from 13 cents per thousand cubic feet for quantities from 5,000,000 to 10,000,000 cubic feet per month downward to 10 cents for quantities from 50,000,000 to 75,000,000 cubic feet.

The initial investment of the company in its project is $200,000, it was said.

R. G. BARNETT NOW WITH JAMES GRAHAM MANUFACTURING CO.

R. G. Barnett, formerly San Francisco manager for the A. B. Stove Company, is now serving the James Graham Manufacturing Company, manufacturers of Wedgewood ranges, in the northern California territory of the company.

J. H. SATTERWHITE MAKES WESTERN BUSINESS TRIP

J. H. Satterwhite, general manager for Westcott & Greis, Inc., of Tulsa, Oklahoma, made a business trip to the far west during September, having for his objective business conferences in San Francisco and Los Angeles.

NEW MEXICO TOWNS NOW HAVE NATURAL GAS

Pecos Valley Gas Company of Roswell, New Mexico, through its president, Albert T. Woods, has announced the completion of its gas lines serving Roswell, Dexter, Hagerman, Artesia, and Carlsbad, New Mexico. The line running north from the Maljamar gas fields at Artesia to Roswell is 8 inches in diameter and the line extending south from the same field to Carlsbad is 5-3/16 inches.

Definite announcement is also made of the organization of the Gas Company of New Mexico which will build an 8-inch line from the Maljamar field into Clovis and Portales.

NEW LINE INCREASES KANSAS CITY'S GAS SUPPLY

Missouri-Kansas Pipe Line Company has recently increased its gas supply into Kansas City by approximately 1,000,000 feet per day through the completion of a 6-inch line from the Bannister Ridge drilling area into Kansas City. In addition to delivering approximately 6,000,000 feet of gas to Kansas City, the company also supplies distributing companies at Belton, Martin City and Grandview, Missouri, and at Paola, Ossawatomie, Bucyrus, Somerset, Louisburg and Chanute, Kansas.

Burt Bay is general manager of the Missouri-Kansas Pipe Line Company.

SO. CAL. GAS CO. GIVEN PERMIT TO PURCHASE PROPERTIES

Southern California Gas Company, with headquarters in Los Angeles, has received permission from the State Railroad Commission to purchase the properties of the Producers Gas and Fuel Company, operating in McKittrick, Kern County, and the Southwestern Gas and Fuel Company, operating in the towns of Beaumont, Banning, San Jacinto and Hemet.

CONSUMERS GAS CO. HAS APPLIED TO SERVE ALAMEDA CO. TOWNS

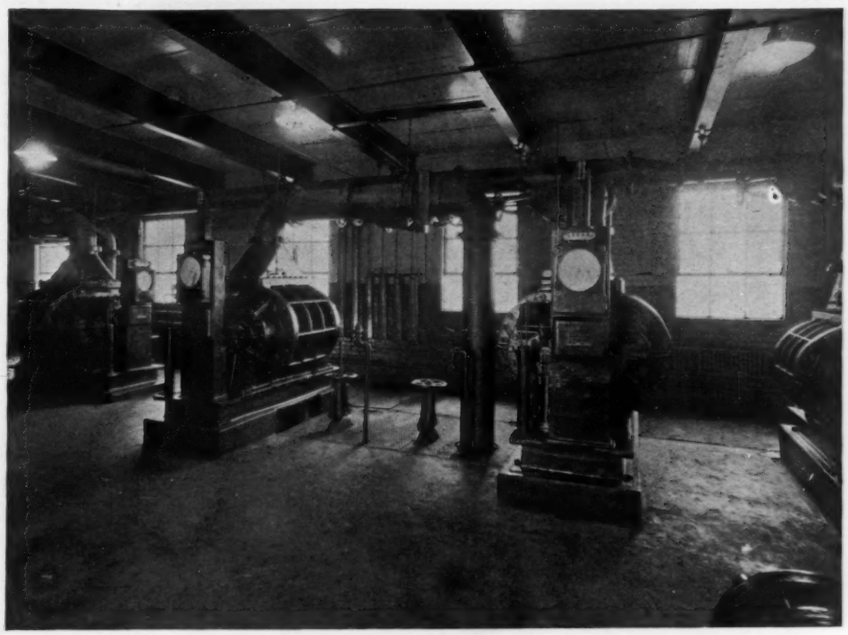
Consumers Gas Company, Inc., with headquarters in San Francisco, California, has applied to the Railroad Commission for permission to construct a natural gas transmission line to serve the towns of Livermore, Pleasanton, Sunol, Dublin, Altamont and adjacent territory in Alameda County. Franchises are being sought by the company in this territory.

MONROE TO ATLANTA GAS LINE SHOWS RAPID PROGRESS

Rapid progress is reported in the construction of the Monroe to Birmingham and Atlanta gas line being built for the Southern Natural Gas Corporation. By the middle of September, 220 miles of main line and laterals had been laid, 234 miles ditched, and approximately 400 miles of right of way cleared.

BOZEMAN HOLDS FRANCHISE ELECTION SEPT 27

An election was due on September 27 to decide on the granting of a natural gas franchise to the Citizens Gas Company, a Minneapolis corporation, in the city of Bozeman, Montana. The proposed franchise provides that the city would be served with gas by December 1, 1930.



Where gas is bought or sold

The dependable accuracy of Connersville Meters, under favorable or unfavorable operating conditions, creates a basis of settlement acceptable to both the buyer and the seller of large volumes of gas.

The list of companies using Connersville Meters for this service contains the names of many of the largest gas companies as well as those of smaller organizations. It will pay you to investigate this modern trend in metering equipment. Ask for Bulletin 4D and the names of some of these users of Connersville Meters.

The Connersville Blower Company

Michigan Ave. at 16th St.

Connersville, Indiana

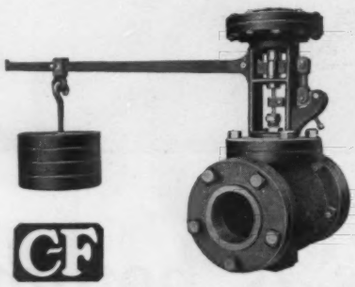
CONNERSVILLE

Blowers-Gas Pumps-Meters-Cycloidal Pumps

Constant Pressure

Under Varying Loads

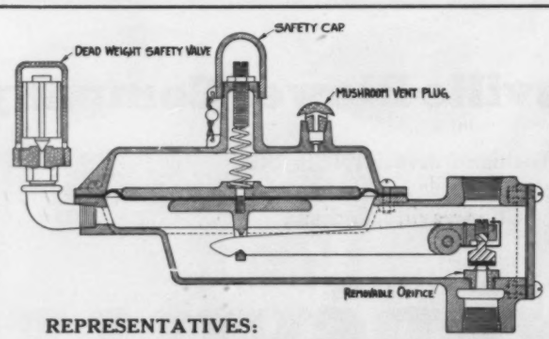
The Fulton Gas Fuel Steam Boiler Governor automatically feeds gas to the boiler furnace through a set of valves, opened by weighted lever and closed by the steam pressure of the boiler, thus admitting or shutting off the gas as the demand for steam varies. It will maintain a constant and unvarying pressure of steam from 1 to 150 pounds or more.



Write for details

The Chaplin-Fulton Mfg. Company

28-40 Penn Ave., Pittsburgh, Pa.



PRESSURE REGULATION FOR ALL REQUIREMENTS

REPRESENTATIVES:

Seidenglanz & Co., Santa Fe Building, Dallas.
Midland Supply Co., Dwight Building, Kansas City.

GROBLE GAS REGULATOR COMPANY, Anderson, Ind.

APPOINTMENTS ANNOUNCED IN WESTERN BYLLESBY PROPERTIES

Glen L. Jackson has been appointed sales manager for the Mountain States Power Company and the California Oregon Power Company, both Byllesby properties, according to an announcement by C. M. Brewer, vice-president and general manager for the two companies. Mr. Brewer also announces the appointment of H. L. Bromley as advertising manager for both companies. He will be assisted by F. E. Ross, formerly of the Botsford-Constantine Advertising Agency.

J. T. SULLIVAN LEAVES RENO FOR NORFOLK, VIRGINIA

J. T. Sullivan, formerly superintendent of the gas and water departments of the Sierra Pacific Power Company, at Reno, Nevada, has been appointed superintendent of the City Gas Company, Norfolk, Virginia. The City Gas Company is a subsidiary of the Virginia Electric & Power Company, a Stone & Webster property. Sierra Pacific Power Company is also owned by Stone & Webster interests.

U. G. I. TO INSTALL WATER-GAS PLANT AT LA PLATA

The Societe Financiere De Transports et D'Entreprises Industrielles, of Brussels, Belgium, has engaged the services of an expert operator and constructor to supervise the installation and operation of the water-gas plant which is now being made by the U. G. I. Contracting Company division of United Engineers & Contructors, Inc., of Philadelphia, at La Plata, Argentine Republic.

PITTSBURGH CO. GIVES PRICE LIST ON NEW VALVES

A 62-page booklet showing sectional and exterior views as well as dimensions and price lists of new gate valves is being distributed by the Pittsburgh Valve, Foundry and Construction Company of Pittsburgh, Pennsylvania, manufacturer of valves for steam, oil and gas lines. The company also manufactures fittings and fabricates and builds piping systems.

PACIFIC LIGHTING CORP. BUYS JAMES H. KNAPP CO.

Announcement was made early in September that the Pacific Lighting Corporation has purchased a controlling interest in the James H. Knapp Company, manufacturer of industrial furnaces with headquarters in Los Angeles.

JOINT SESSION IN APRIL TO BE AT ARIZONA BILTMORE

In April, 1930, will be held the annual joint conference of the Arizona Utilities Association, Pacific Coast Gas Association and Pacific Coast Electric Association. The Arizona Biltmore, near Phoenix, has been named as convention headquarters.

LEWIS MOORE VISITS PACIFIC COAST IN SEPTEMBER

Lewis Moore, Jr., of Moore Brothers Company, of Joliet, Illinois, recently made a trip to the Pacific Coast, covering territory from the Pacific Northwest to Los Angeles. Mr. Moore exhibited the Puritan Heater to gas utilities in Pacific states.

THE BABY DIGGER

For Efficient Trench Digging

Useful in more than 90% of your trenching jobs, the Baby Digger, because of its compactness, power, and mobility, will deliver for you maximum trench footage at minimum cost. The big per cent of your trench digging jobs must be done in closely confined areas.

Cleveland Baby Digger, the pioneer small trencher, is particularly adapted for this type of work. Precision built, of the finest materials, to advance design, the Baby Digger will perform the hardest digging jobs with ease, speed, and profit. It has abundant power, absolute dependability, maximum mobility, and unrivaled economy of operation.

More than 140 Cleveland Baby Diggers are now being used by over 70 gas companies efficiently and economically. Can you afford to miss the real saving these companies are securing? Write for information today.

The CLEVELAND TRENCHER COMPANY

"Pioneers of the Small Trencher"

20100 St. Clair Avenue, Cleveland, Ohio, U. S. A.

Sold by

EDWARD R. BACON, Inc.

17th at Folsom Streets
San Francisco, California

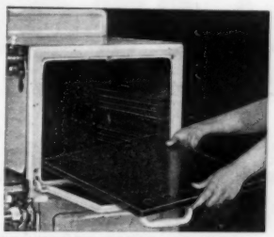
Wedgewood

Since 1882

CLOSED TOP

The Premier Gas Range Line of the West

A line which has reached the highest development in each and every feature ever attained in the manufacture of Gas Ranges. There is no substitute for quality in the WEDGEWOOD and no line of Gas Ranges more beautiful.



There is a WEDGEWOOD for every possible need from a one-burner gas-plate to a mammoth six-burner, two-oven range.

Note how easy the porcelain enameled oven linings are removed.

Replacement parts always obtainable.

Our Radio Advertising

is showing very definite returns. Listen to Ann Holden, N. B. C. Domestic Science Authority, every Tuesday at 11:10 a. m. over KGO, KPO, KFI, KGW, KHQ, KOMO, National Broadcasting System.

JAMES GRAHAM MFG. CO.

LARGEST STOVE MANUFACTURERS IN THE WEST

COMBINATION RANGES COAL AND WOOD RANGES
GAS RANGES

San Francisco Los Angeles Newark, Calif.

EMPIRE
Oil Meters

Positive Displacement
Oscillating Piston Type

Simple in Construction—Easy to Operate—Low in Cost of Maintenance

EMPIRE meters are highly accurate, and **stay** accurate. They are invaluable for cracking and absorption processes; for gas companies; for refiners and distributors of gasoline and all distillates of petroleum; for measurement of crude oil, cold or hot.

ALL SIZES 5/8" TO 6"

Standard meters will withstand working pressures of 150 lbs. to the square inch. High pressure types will handle 300 lbs. Higher pressures and special types to order.

National Meter Company

299 Broadway, New York

1048 Folsom Street, San Francisco **645 Santa Fe Avenue, Los Angeles**

CONSIDER!

Intelligent Manufacture of

REFRACTORIES

Is Based on Intelligent

Research

And—intelligent application of
THE RIGHT REFRACTORY
IN THE RIGHT PLACE
is based on experience

CONSULT OUR EXPERTS

GLADDING, McBEAN & CO.
San Francisco - Oakland - Fresno
Los Angeles - Portland - Seattle

Classified Advertising

Classified advertising five cents per word; minimum $2.00 per insertion. Situation Wanted advertisements up to 50 words will be published three consecutive issues without charge.

SITUATION WANTED—MALE

Civil Engineer, 30 years of age, with eight years experience in gas transmission and distribution line work, also land and lease work, desires connection with pipeline construction company, valuation company, or gas company. Good references. Address B-92, care of *Western Gas*, 124 West 4th Street, Los Angeles, California.

N. G. E. CO. BULLETIN OFFERS GAS PROBLEM SOLUTIONS

Natural Gas Equipment, Inc., with headquarters in Los Angeles, recently issued a stiff-cover booklet, called "Twenty-one Gas Burner Problems and Their Solution." The 21 problems are stated, and the ensuing pages are given over to suggested solutions together with descriptions of the various N. G. E. Burners. Charts showing typical installations, and a capacity calculating chart for all types of the company gas burners for boilers are also given.

BRISTOL CO. ISSUES BULLETIN ON PSYCHROMETERS

A technical bulletin, describing recording psychrometers, has recently been sent to the trade by the Bristol Company of Waterbury, Connecticut. The new brochure sets forth the purpose of the instruments, and describes the individual instruments and their methods of installation, with charts and photographs for illustration. Copies of the booklet may be had by sending a request to the company.

PORTLAND GAS & COKE CO. SELLS MOTOR-FUEL RIGHTS TO SHELL

Portland Gas & Coke Company of Portland, Oregon, recently announced that the company has disposed of the distribution of Gasco motor fuel, to the Shell Company, the latter company taking over the management and control of some 90 service stations early in September.

P. G. AND E. ASKS TO SELL NEW ISSUE TO STOCKHOLDERS

Pacific Gas and Electric Company of San Francisco has applied to the California Railroad Commission for authority to issue and sell to its present stockholders, 312,816 shares of common stock, in the ratio of one share of the new stock to each 10 shares of stock now owned by the stockholders.

A. G. A. TESTING LABORATORY ADDS TWO CLASSIFICATIONS

The American Gas Association's Testing Laboratory recently began approval tests on gas-fired clothes-dryers and portable incinerators. Practically all of the domestic gas appliance field is now covered by the laboratory.

A New FIRST AID Catalog!

Free
FOR THE ASKING

Send today for your copy of this 32 page Catalog of First Aid Materials which lists hundreds of items, with numerous illustrations of the latest developments for the treatment of injuries.

Mine Safety Appliances Co.
Braddock, Thomas and Meade, Pittsburgh, Pa.

PACIFIC COAST BRANCH
318 East Third St. Los Angeles, Calif.

NORTHWESTERN HEADQUARTERS
71 Columbia St. Seattle, Wash.

DIRECTORY of the Industry

Byllesby Engineering and Management Corporation

231 S. La Salle Street
CHICAGO

New York Pittsburgh San Francisco

SMITH-EMERY CO.
Chemists—Engineers
Established 1910
Analyses and tests. Represent Pittsburgh Testing Laboratory for inspection at Eastern foundries, mills and shops.
Offices & Laboratories
920 Santee St., Los Angeles
651 Howard St., San Francisco

J. B. GILL CORPORATION
NATURAL GAS ENGINEERS
COMPRESSOR PLANT DESIGN AND CONSTRUCTION
P. O. BOX 669 LONG BEACH, CALIFORNIA

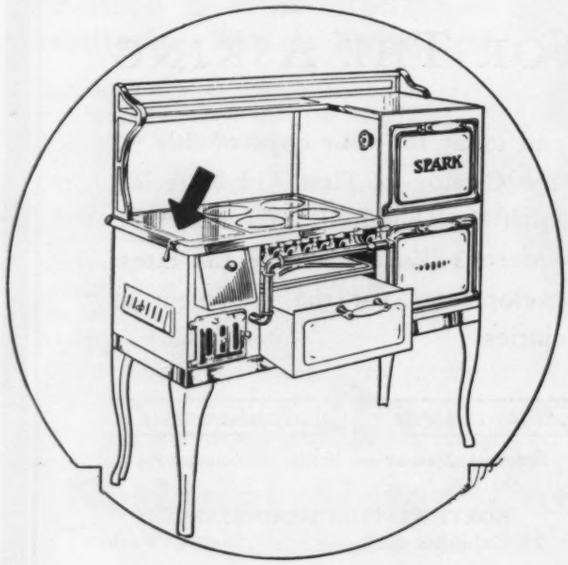
WALTER REID
CONSULTING NATURAL GAS ENGINEER
ATHLETIC CLUB BUILDING, DALLAS

WESTERN GAS from time to time receives requests from manufacturers asking to be put in touch with capable men or organizations in the Southwest or on the Pacific Coast who are able to effectively market their products in the western gas industry.

We also receive requests for suggestions from men or selling organizations covering the Pacific Coast as well as the Mid-Continent section, who desire to extend their activities in this industry by taking on new products or additional lines.

If we can be of service to you in this way, get in touch with any one of our three offices—**Los Angeles, 124 West Fourth Street; Dallas, 307 Thomas Bldg.; San Francisco, 447 Sutter Street.**

The Three-Thirds Gas Stove



Beneath the Griddle top of the kitchen heater is a patented burner operating from the upper section of the firebox, providing a scientific gas-fired heating plant for the kitchen.

In the ordinary gas stove, only two-thirds of the cooking surface can be heated with gas. The remaining one-third is the top of the incinerator and has to be heated with coal or wood. The Spark Lid-Top with the patented kitchen heater burner is the only all-gas stove on the market. For the housewife this means 50 per cent additional cooking surface. And for the gas company it means an increased cooking load, a feature that every utility should consider.

SPARK
Griddle-top
GAS STOVE

The Hammer-Bray Company **Oakland California**

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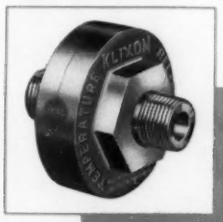
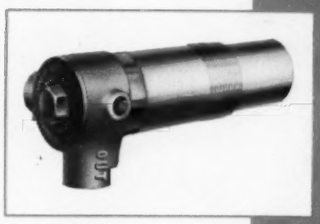
SIX IMPORTANT KLIXON PRODUCTS

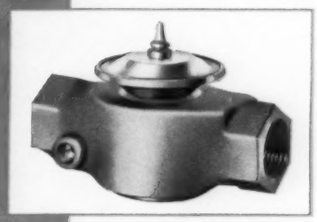


Reseating Temperature Relief Valve

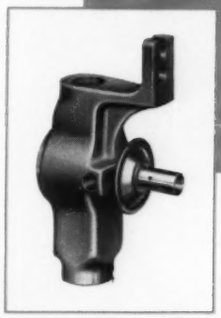
Safety Pilot for Barber Burners and other atmospheric burners of similar design



Immersion Type Thermostat



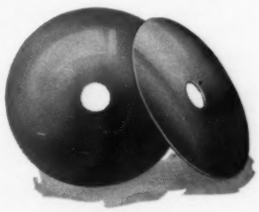
Safety Pilot for Gas Ranges



Safety Pilot for Circulating Tank Heaters

Safety Burner for Gas Refrigerators

KLIXON Means "Automatic" for Gas



Spencer Discs bi-metallic, dished thermal elements that give positive action

KLIXON products offer the exclusive advantages of the Spencer Disc Thermostat.

The inherent snap action of the Spencer Disc is responsible for the utter simplicity of these devices and accounts for their consistent performance whether called upon to act at frequent intervals or to lie dormant for years.

We invite you to write us for complete information.

B. W. MUELLER, Western Representative
447 Sutter Street, San Francisco, California

SPENCER THERMOSTAT CO.

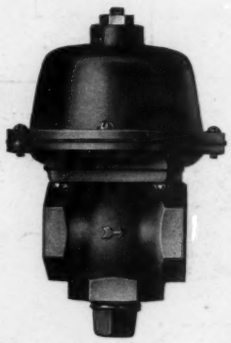
Cambridge, Massachusetts

For less than it costs you

to make one call to correct Ice Box or Water Heater Pressure troubles you can make a permanent cure by installing a

Sprague Number "O" Low Pressure Regulator

Weight under two pounds.
½" inlet and outlet.
Dead weight.
Set for 3" unless ordered otherwise.



Request a Sample Today

THE SPRAGUE METER CO.

Bridgeport, Conn.

Los Angeles, Cal. San Francisco, Cal.